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GS MASTER NOTES

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POLITY

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1.PREAMBLE

What is the Preamble?

- The Preamble is the **introductory statement** of the Constitution.
- It expresses the **philosophy and objectives** of the Constitution.
- Based on the **Objectives Resolution** by **Jawaharlal Nehru** (adopted on 22 January 1947).
- Adopted on **26 November 1949**, came into effect on **26 January 1950**.

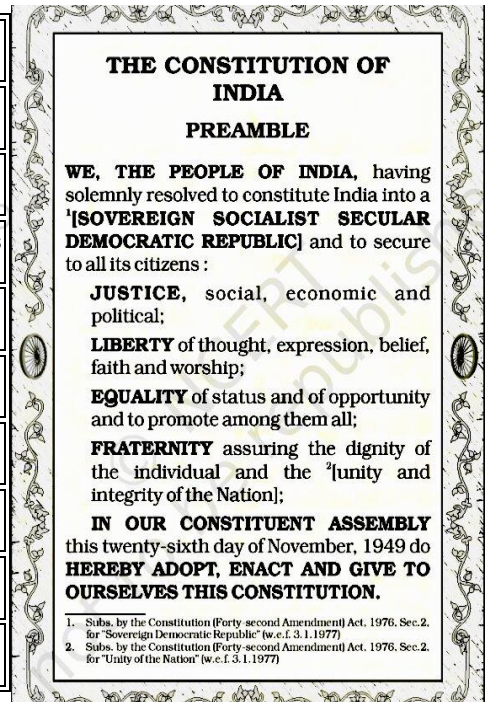
Text of the Preamble (after 42nd Amendment)

"We, the people of India, having solemnly resolved to constitute India into a **SOVEREIGN, SOCIALIST, SECULAR, DEMOCRATIC REPUBLIC...**"

(Only **Socialist, Secular, and Integrity** were added via **42nd Amendment**)

Key Words in the Preamble

Term	Meaning/Explanation
Sovereign	India is free to make its own laws and decisions
Socialist	Equal wealth distribution, no exploitation
Secular	State has no official religion; equal treatment of all religions
Democratic	Government by elected representatives
Republic	Head of the state is elected, not hereditary
Justice	Fair treatment (social, economic, political)
Liberty	Freedom of thought, expression, belief, faith, worship
Equality	Equal opportunity and treatment
Fraternity	Spirit of brotherhood; unity and integrity of the nation



Important Facts for SSC

- Preamble is **not enforceable by courts** (non-justiciable).
- **42nd Amendment (1976)** added: **Socialist, Secular, Integrity**. (Amended only once)
- **Berubari Case (1960)**: Preamble is **not part of the** Constitution.
- **Kesavananda Bharati Case (1973)**: Preamble is **part of the** Constitution and part of **Basic Structure**.
- It can be amended **under Article 368**, but **not the basic structure**

2.FUNDAMENTAL RIGHTS

What are Fundamental Rights?

- Fundamental Rights are guaranteed by the Constitution to all citizens.
- Enshrined in Part III of the Constitution (Articles 12 to 35).
- Described as the “Magna Carta of India”.
- They are justiciable (can be enforced by courts).
- Inspired by the US Constitution.

List of Fundamental Rights (Articles 14–32)

S.No	Fundamental Right	Articles Covered
1	Right to Equality	Articles 14 to 18
2	Right to Freedom	Articles 19 to 22
3	Right Against Exploitation	Articles 23 and 24
4	Right to Freedom of Religion	Articles 25 to 28
5	Cultural and Educational Rights	Articles 29 and 30
6	Right to Constitutional Remedies	Article 32

Right to Equality (Articles 14–18)

- Article 14: Equality before law and equal protection of laws
- Article 15: Prohibition of discrimination
- Article 16: Equality of opportunity in public employment
- Article 17: Abolition of untouchability
- Article 18: Abolition of titles (except military/academic distinctions)

Right to Freedom (Articles 19–22)

- Article 19: Six freedoms (speech, assembly, association, movement, residence, profession)
- Article 20: Protection in respect of conviction for offences
- Article 21: Protection of life and personal liberty
- Article 21A: Right to elementary education (added by 86th Amendment)

- Article 22: Protection against arrest and detention

Right Against Exploitation (Articles 23–24)

- Article 23: Prohibits human trafficking and forced labour
 - Article 24: Prohibits child labour (below age 14) in hazardous jobs
-

Right to Freedom of Religion (Articles 25–28)

- Article 25: Freedom of conscience and religion
 - Article 26: Manage religious affairs
 - Article 27: No tax for promoting religion
 - Article 28: Freedom from attending religious instruction in certain institutions
-

Cultural and Educational Rights (Articles 29–30)

- Article 29: Protection of interests of minorities
 - Article 30: Right of minorities to establish educational institutions
-

Right to Constitutional Remedies (Article 32)

- Called the “Heart and Soul” of the Constitution – Dr. B.R. Ambedkar
 - Allows citizens to approach the Supreme Court for enforcement of rights
 - Writs (5): Habeas Corpus, Mandamus, Certiorari, Prohibition, Quo-Warranto
-

Important Facts for SSC

- Right to Property was removed in 1978 by the 44th Amendment and made a legal right under Article 300A.
- Article 13 declares any law violating Fundamental Rights as null and void.
- Article 12 defines the term ‘State’ for the purpose of Fundamental Rights.
- Article 21A was added by the 86th Amendment Act, 2002 to make free and compulsory education a Fundamental Right for children aged 6 to 14.

Constitutional Remedies – Article 32

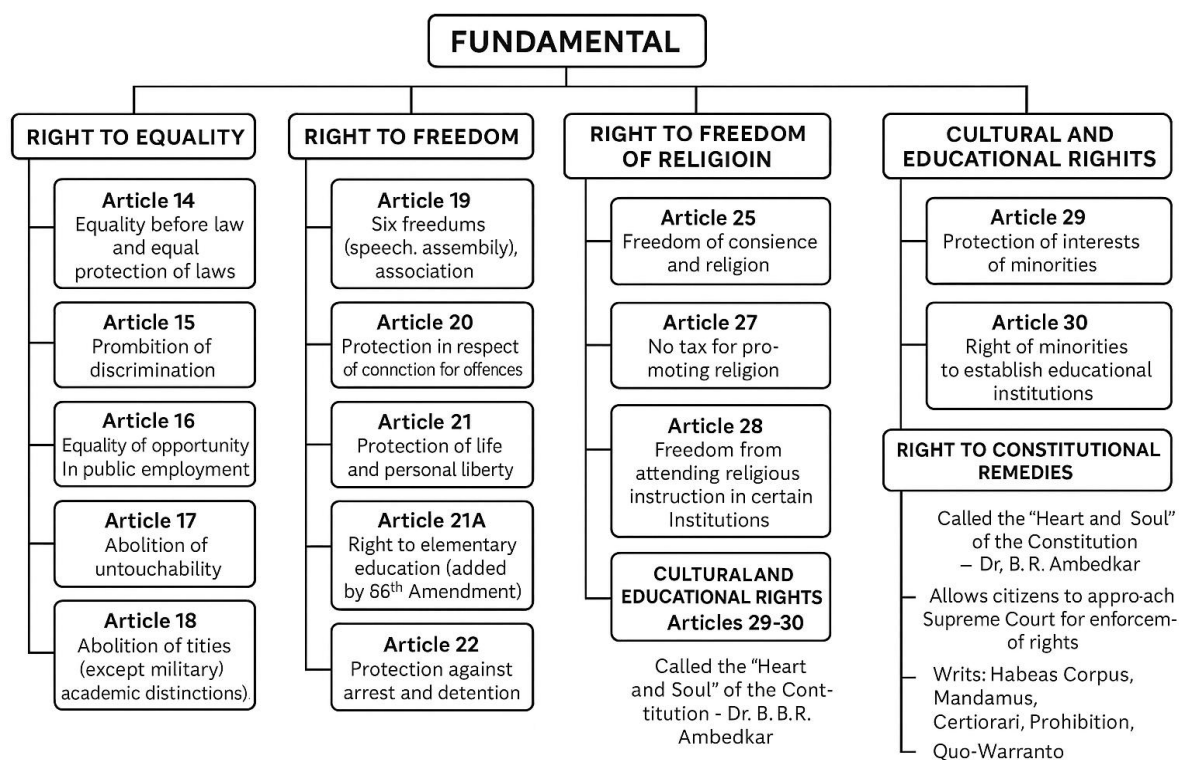
- It allows individuals to approach the Supreme Court directly for the enforcement of Fundamental Rights.
- Called the “Heart and Soul of the Constitution” by Dr. B.R. Ambedkar.
- The Supreme Court and High Courts (under Article 226) can issue Writs to protect Fundamental Rights.

Types of Constitutional Remedies (Writs)

Writ Name	Purpose / Use Case	Meaning in Simple Terms
Habeas Corpus	To produce the body — used when someone is illegally detained	"Bring the person to court"
Mandamus	To command a public official/body to perform its legal duty	"You must do your duty"
Prohibition	Issued by a higher court to stop a lower court from exceeding its powers	"Stop doing what you're not allowed to do"
Certiorari	To transfer a case to a higher court or quash a decision of a lower court- "to be certified"	"Correct your mistake"
Quo-Warranto	Issued to a person holding a public office illegally	"By what authority do you hold this post?"

Key Points to Remember

- Article 32 is available only for Fundamental Rights (not for other legal rights).
- Only the Supreme Court can be approached under Article 32;
- High Courts under Article 226 can enforce both Fundamental and other legal rights.
- Writ jurisdiction is a powerful check on government excesses.



3.DPSP- Directive Principles of State Policy

- Part IV of the Constitution (Articles 36 to 51). Borrowed from the Irish Constitution.
- **Non-justiciable** (not enforceable in courts).
- Aim: To establish **a welfare state** and guide the State policy.

1. Socialistic Principles

Article	Directive
38	Promote welfare of people and reduce inequality
39	Equal pay for equal work, adequate livelihood, protect children/women
41	Right to work, education and public assistance
42	Just and humane conditions of work, maternity relief
43	Living wage and decent life for workers
47	Raise level of nutrition and public health

2. Gandhian Principles

Article	Directive
40	Establish village panchayats
43B	Promote cooperative societies (added by 97th Amendment, 2011)
46	Promote education and welfare of SCs, STs, and weaker sections
48	Organize agriculture and animal husbandry on scientific lines
47	Prohibit intoxicating drinks and drugs

3. Liberal-Intellectual (Western) Principles

Article	Directive
44	Uniform Civil Code for all citizens
45	Early childhood care and education (up to age 6) – (modified by 86th Amd.)
48A	Protect and improve environment (added by 42nd Amendment, 1976)
49	Protect monuments and cultural heritage
50	Separation of judiciary from executive
51	Promote international peace and cooperation

Key Points for SSC

- Article 39B & 39C promote social justice and prevent concentration of wealth.
 - DPSPs are non-enforceable, but guiding principles for governance.
 - Article 37: States that DPSPs are not enforceable, but fundamental in governance.
 - **Fundamental Rights = Justiciable.**
 - **DPSPs = Non-Justiciable.**
 - **Fundamental Duties = Non-Justiciable.**
-

Frequently Asked MCQ-Style Facts

- Uniform Civil Code – Article 44
- Promotion of International Peace – Article 51
- Environment protection – Article 48A
- Equal pay for equal work – Article 39
- DPSP Part – Part IV (Article 36 to 51)

4.FUNDAMENTAL DUTIES

What are Fundamental Duties?

- Listed in **Part IVA** of the Constitution.
- Covered under Article 51A.
- These are moral obligations of every Indian citizen.
- **Not enforceable** by courts (non-justiciable).
- Inspired by the **USSR Constitution**.

Origin

- **Added by: 42nd Constitutional Amendment Act, 1976**
- Based on: Recommendations of the Swaran Singh Committee (1976)
- Originally 10 Duties; 11th added by 86th Amendment (2002)

List of 11 Fundamental Duties (**Article 51A**) – Only one Article

1. Abide by the Constitution and respect its ideals and institutions, National Flag, and National Anthem.
2. **Cherish the noble ideals of the freedom struggle.**
3. Uphold and protect the sovereignty, unity, and integrity of India.
4. Defend the country and render national service when called upon.

5. Promote harmony and spirit of common brotherhood.
6. Preserve the rich heritage of our composite culture.
7. **Protect and improve the natural environment (forests, lakes, rivers, wildlife).**
8. Develop scientific temper, humanism, and the spirit of inquiry.
9. Safeguard public property and avoid violence.
10. Strive for excellence in all spheres to raise national prestige.
11. **(Added in 2002) – Provide opportunities for education to children aged 6–14 years.**

Key Features for SSC

- Fundamental Duties are non-justiciable (cannot be enforced by court).
- No legal penalties for violating duties, but Parliament can make laws.
- **11th duty added by the 86th Amendment** (same as Article 21A for Right to Education).
- SSC often asks:
 - Who recommended Fundamental Duties? → **Swaran Singh Committee**
 - When were they added? → **42nd Amendment, 1976**

Comparison: Fundamental Rights vs DPSP vs Fundamental Duties

Feature	Fundamental Rights	DPSP	Fundamental Duties
Part of Constitution	Part III (Articles 12–35)	Part IV (Articles 36–51)	Part IVA (Article 51A)
Nature	Justiciable (can be enforced in court)	Non-justiciable (not enforceable in court)	Non-justiciable
Objective	Protect individual freedoms	Guide the State in law & policy-making	Promote civic and moral responsibility
Focus	Individual-centric	Society & welfare state-centric	Citizen-centric
Source	Inspired by U.S. Constitution	Inspired by Irish Constitution	Inspired by USSR Constitution
Who enforces?	Supreme Court & High Courts	Not legally enforceable	Self-enforced by citizens
Amendments	44th Amendment removed Right to Property	42nd & 97th Amendments added provisions	42nd Amendment added Part IVA
Examples	Right to Equality (Art. 14–18), Right to Freedom (Art. 19–22)	Equal pay (Art. 39), UCC (Art. 44), Environment (Art. 48A)	Respect Constitution, Promote harmony, Protect environment

5. PRESIDENT

Basic Information

- **Articles Covered: 52 to 62** (Part V, Chapter I)
- **Head of the Indian State and nominal executive** (constitutional head)
- **Elected**, not hereditary
- **First President:** Dr. Rajendra Prasad
- **Current President (2025):** Droupadi Murmu
- Must act on the **aid and advice of the Council of Ministers** (**Article 74**)

Election of the President (**Article 54**)

- **Elected indirectly** by an **Electoral College** consisting of:
 - **Elected members** of Lok Sabha and Rajya Sabha
 - **Elected MLAs** of all States and Union Territories with legislatures (Delhi, Puducherry, J&K)
- ♦ **Nominated members do not participate**
- ♦ Elected through **Proportional Representation (PR)** by **Single Transferable Vote (STV)** (**Article 55**)

Qualifications to Become President (**Article 58**)

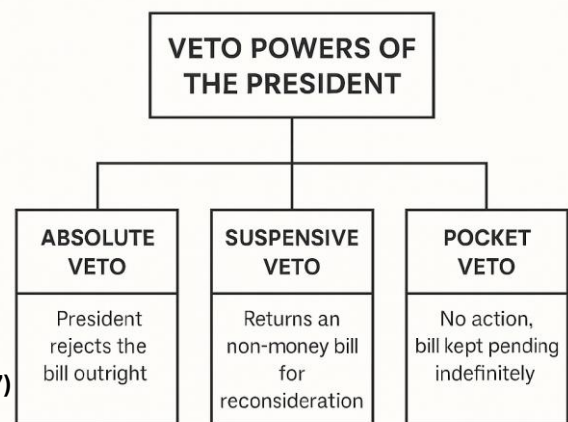
- Citizen of India
- **Minimum age: 35 years**
- **Eligible for Lok Sabha election**
- **Should not hold any office of profit**

Term, Oath (Article 60), and Resignation

- **Term:** 5 years (**Article 56**)
- Can be re-elected any number of times (**Article 57**)
- Takes oath before the **Chief Justice of India**
- Can resign to the **Vice President**

Impeachment of President (Article 61)

- Can be removed only for "**violation of the Constitution**"
- **Initiated by either House of Parliament**
- **Requires:**
 - Signed notice by **1/4th members**
 - After investigation, passed by **2/3rd of total membership** of both Houses
- **Only MPs participate (Including Nominated Members of Parliament)** — **No role of MLAs**



Pardoning Powers (Article 72)

Type of Pardon	Meaning
Pardon	Complete forgiveness; cancels sentence and conviction
Commutation	Substitutes with a less severe punishment
Remission	Reduces sentence without changing the nature of punishment
Respite	Awards lesser punishment on special grounds (e.g., pregnancy)
Reprieve	Temporary stay of execution for judicial review

Veto Powers of the President

Type of Veto	Meaning & Use Case
Absolute Veto	President rejects the bill outright (e.g., private member's bill)
Suspensive Veto	Returns a non-money bill for reconsideration
Pocket Veto	No action , bill kept pending indefinitely (no time limit in India)

♦ Cannot return **Money Bills**

- ♦ Can only delay **Constitutional Amendment Bills** but cannot reject or return them

Powers of the President

Category	Powers
Executive	Appoints PM, Governors, Judges of SC/HC, CAG, EC, AG, etc.
Legislative	Summons, prorogues Parliament; dissolves Lok Sabha; addresses sessions
Judicial	Pardoning powers (Art 72), appoints judges
Emergency	Can declare National (Art 352), State (Art 356), Financial (Art 360) emergencies
Financial	Causes Budget to be laid; no money bill introduced without consent

Quick MCQ Facts for SSC

- **Article 52:** There shall be a President of India
- **Article 53:** Executive power of the Union vested in President
- **Impeachment:** Article 61, if president is removed from office vice president will take charge up to maximum period of 6 months
- **Pardoning Power:** Article 72 (Note: Governor's pardoning power is under Article 161, but does not include death sentence cases.)
- No time limit for Pocket Veto
- Election via **Proportional Representation by STV**,

6. VICE- PRESIDENT

Basic Information

- **Articles Covered:** 63 to 70
- **Position:** Second-highest constitutional authority in India
- **Current Vice President (2025):** Jagdeep Dhankhar
- **First Vice President:** Dr. S. Radhakrishnan

Office & Role

- **Ex-officio Chairman of Rajya Sabha** (Article 64)
- Performs functions of the **President in their absence** (death, resignation, removal, or incapacity) until a new President is elected

Qualifications (Article 66)

- Citizen of India
- Minimum age: **35 years**
- **Qualified to be a member of Rajya Sabha**
- Must not hold any **office of profit**

Election Process (Article 66)

- Elected **indirectly** by the members of an **Electoral College**
 - Includes **only elected and nominated members of both Houses of Parliament (LS + RS)**
 - **MLAs do NOT participate**
- Elected through **Proportional Representation (PR)** by **Single Transferable Vote (STV)**
- **Secret ballot** is used

Term, Resignation, & Removal

- **Term:** 5 years (can be re-elected)
- Resigns by writing to the **President**
- Can be removed by a **resolution of the Rajya Sabha** passed by a **majority** and agreed to by the **Lok Sabha**

Functions of Vice President

Role	Explanation
Chairman of Rajya Sabha	Presides over Rajya Sabha sessions
Acts as President	When President is unable to discharge duties
No executive powers	Unlike President, doesn't exercise executive functions

Important Facts for SSC CGL

- **Article 63:** There shall be a Vice President of India
- **Article 66:** Manner of election
- **Does not hold any ministerial or executive role**
- **Can act as President for up to 6 months**
- **Not part of Cabinet meetings or Council of Ministers**

MCQ Highlights

- **Vice President is elected by: Both Houses of Parliament**
- First VP of India: **Dr. S. Radhakrishnan**
- Who presides over Rajya Sabha? **Vice President (Ex-officio Chairman)**
- Who acts as President in their absence? **Vice President**

7.PRIME MINISTER & COUNCIL OF MINISTERS

Prime Minister of India

Basic Information

- **Article 74 & 75** cover the Prime Minister and Council of Ministers
- **Real executive authority** (de facto head), while the President is the nominal head
- **Appointed by the President** (Article 75)
- **Current Prime Minister (2025): Narendra Modi**
- **First PM: Jawaharlal Nehru**

Qualifications

- Must be a **citizen of India**
- Must be a **member of Parliament** (Lok Sabha or Rajya Sabha)
- If not a member, must get elected **within 6 months**

Powers and Functions of the Prime Minister

Area	Power/Function
Executive	Allocates portfolios among ministers; advises President on appointments
Legislative	Leader of the Lok Sabha; chief spokesperson of the government
Administrative	Chairs meetings of the Council of Ministers
Foreign Affairs	Represents India in global affairs

Council of Ministers

Structure (Three Categories):

Type of Minister	Role/Example
Cabinet Ministers	Key decision-makers (e.g., Finance, Defence)
Ministers of State (MoS)	Junior ministers (may or may not have independent charge)
Deputy Ministers	Assist Cabinet or MoS ministers

Constitutional Provisions

Article	Provision
Art. 74	President shall act as per advice of Council of Ministers
Art. 75(1)	PM is appointed by the President
Art. 75(3)	Council is collectively responsible to Lok Sabha
Art. 77	Conduct of business of Government of India
Art. 78	PM's duty to communicate with President

Important Points for SSC CGL

- **PM is the head of the government; President is head of the state**
- The **Council of Ministers is collectively responsible to Lok Sabha**
- **Council of Ministers ≠ Cabinet** (Cabinet is a smaller, decision-making body)
- Ministers **hold office during the pleasure of the President**, but on PM's advice

8. PARLIAMENT

Composition of Parliament (Article 79)

Component	Role
President	Part of Parliament; does not sit in either house
Lok Sabha	Lower House (House of the People)
Rajya Sabha	Upper House (Council of States)

Comparison: Lok Sabha vs Rajya Sabha

Feature	Lok Sabha	Rajya Sabha
Article	81	80
Max Strength	552 (now 543 elected)	250 (now 245)
Term	5 years (can be dissolved)	6 years (1/3rd retire every 2 years)
Minimum Age	25 years	30 years
Election Method	Direct (first-past-the-post)	Indirect (by state MLAs using STV)
Presiding Officer	Speaker	Vice President (Chairman)
Money Bill Powers	Has full control	Can only give recommendations
Dissolution	Can be dissolved	Cannot be dissolved

Important Offices in Parliament

Office	Description
Speaker	Presiding officer of Lok Sabha; elected by LS members
Deputy Speaker	Elected by LS members; acts in absence of Speaker
Pro Tem Speaker	Temporarily appointed to conduct first sitting of Lok Sabha after elections
Chairman	Vice President; presides over Rajya Sabha
Deputy Chairman	Elected by RS members; acts in absence of Chairman
Leader of House	Usually Prime Minister or Minister in Lok Sabha/Rajya Sabha
Leader of Opposition	Leader of largest opposition party (with $\geq 10\%$ seats)
Whip	Ensures party discipline in voting

Types of Bills & Their Comparison

Feature	Ordinary Bill	Money Bill	Constitutional Amendment Bill
Article	General lawmaking	Article 110	Article 368
Introduced in	Either House	Only Lok Sabha	Either House
President's recommendation	Not required	Required before introduction	Not required
Rajya Sabha's role	Full powers	Can only recommend (within 14 days)	Equal power; no joint sitting
Joint Sitting possible?	Yes (Article 108)	No	No
Voting majority	Simple majority	Simple majority	Special majority (2/3rd present & voting + 50% total strength)
Certification	Not needed	Speaker certifies it as a Money Bill	Not needed

Parliamentary Sessions (Article 85)

Session	Purpose
Budget Session	Feb–May (longest & most important)
Monsoon Session	July–September
Winter Session	November–December

Maximum gap between sessions: 6 months

Quorum: 10% of total membership required for House proceedings

Joint Sitting of Parliament (Article 108)

- Called by **President** to resolve deadlock on an **Ordinary Bill**, Presided over by **Speaker** of Lok Sabha
- Not applicable to: Money Bill, Constitutional Amendment Bill**

Powers & Privileges of Parliament (Article 105)

Type	Description
Collective Privileges	Freedom of speech in Parliament, publish proceedings, no civil/criminal liability for speech
Individual Privileges	Freedom from arrest (in civil cases) during sessions, immunity from court for official actions

Comparison: Powers of Lok Sabha vs Rajya Sabha

Power Type	Lok Sabha	Rajya Sabha
Legislative Powers	Equal powers in passing ordinary bills	Equal powers in ordinary legislation
Money Bill	Exclusive power to introduce and pass money bills	Can only give recommendations within 14 days (Article 110)
Financial Control	Controls finances, passes budget, grants, and taxation	No financial control; cannot amend or reject a Money Bill
Confidence Motion	Can pass no-confidence motion to remove Council of Ministers	Cannot initiate no-confidence motion
Council of Ministers	Council is collectively responsible only to Lok Sabha (Art. 75)	No such provision
Speaker's Election	Elects Speaker and Deputy Speaker	No such powers
President's Impeachment	Participates equally in impeachment proceedings	Participates equally (requires 2/3 majority in both houses)
Amendment Bills	Equal powers (must be passed by both Houses) under Article 368	Equal powers (no joint sitting if disagreement)
Joint Sitting (Art. 108)	Greater power due to numeric majority in joint sitting	Lesser influence due to fewer members
Emergency Proclamation	Approves President's emergency declarations	Equal role in approving emergency proclamations
Removal of VP	Participates in removal of Vice President	Initiates the resolution (must originate in Rajya Sabha)
Creates New All-India Services	No role	Can recommend creation of All-India Services (Article 312)
Dissolution	Can be dissolved by President	Permanent body ; cannot be dissolved

Leader of Opposition

- The **Leader of Opposition (LoP)** is the **leader of the largest opposition party** in the **Lok Sabha** and **Rajya Sabha**.
- The party must have **at least 10% of total seats** in the House to claim LoP status.
- Recognized under **the Salary and Allowances of Leaders of Opposition in Parliament Act, 1977**
- Not mentioned in the Constitution** (it is a statutory post, not constitutional)

Rajya Sabha's Powers over Different Types of Bills

Feature / Bill Type	Ordinary Bill	Constitutional Amendment Bill	Money Bill
Definition Article	Not defined separately	Article 368	Article 110
Can Rajya Sabha introduce it?	✓ Yes	✓ Yes	✗ No (only in Lok Sabha)
Rajya Sabha's role	✓ Full powers — can amend, pass, reject	✓ Full powers — must pass the bill	✗ Limited role — can only recommend
Amendment power	✓ Can suggest and pass amendments	✓ Can propose amendments (must be agreed by both Houses)	✗ Cannot amend or reject
Time limit to act	No time limit	No time limit	Must return in 14 days
Can it reject the bill?	✓ Yes	✓ Yes (bill fails if not passed in both Houses)	✗ No (considered passed after 14 days)
Joint sitting if deadlock?	✓ Yes (Article 108)	✗ No joint sitting for constitutional amendments	✗ No joint sitting for money bills
Presiding officer for joint sitting	✓ Speaker of Lok Sabha	✗ Not applicable	✗ Not applicable
Special majority required?	✗ No (Simple majority)	✓ Yes (Special majority: 2/3 present & voting + 50% total)	✗ No (Simple majority in Lok Sabha only)
Final authority	Parliament + President	Parliament + President	✓ Lok Sabha (Speaker's certification is final)

Key SSC CGL Takeaways:

- Rajya Sabha has equal power in Constitutional Amendments, limited power in Money Bills, and full power in Ordinary Bills.**
- Joint Sitting is allowed only for Ordinary Bills.**
- Money Bill is certified by Speaker and cannot be amended by Rajya Sabha.**
- Constitutional Amendment Bill fails if either House does not pass it.**

Question Hour

- Held during the first hour of every parliamentary sitting (11:00 AM – 12:00 PM).
- MPs ask questions to ministers to hold them accountable.

Two types:

- Starred (oral reply, allows supplementary questions)
- Unstarred (written reply only)

- Notice is compulsory (usually 15 days before).

Zero Hour

- Starts immediately after Question Hour.
- Not mentioned in the rules; it's a convention (informal practice).
- Used to raise urgent matters without prior notice.

Short Duration Discussion (2-Hour Discussion)

- Also called Rule 193 discussion in Lok Sabha.
- Allows MPs to raise matters of urgent public importance for brief discussion.
- Notice must be given in advance.
- Ministers reply after discussion, but no vote is taken.

Calling Attention Motion

- Used to draw attention of a minister to a serious issue.
- Introduced by an MP with short notice.
- The concerned minister must give a formal reply.
- There is no debate after the reply.

Effect of Lok Sabha Dissolution on Different Bills

Type of Bill	Status After Lok Sabha Dissolution
Ordinary Bill (Pending in Lok Sabha)	✗ Lapses
Ordinary Bill (Passed by Lok Sabha, Pending in Rajya Sabha)	✗ Lapses
Ordinary Bill (Passed by Both Houses)	✓ Does NOT lapse — awaiting President's assent
Money Bill (Pending in Lok Sabha)	✗ Lapses
Money Bill (Passed by Lok Sabha, Pending in Rajya Sabha)	✗ Lapses
Money Bill (Passed by Both Houses)	✓ Does NOT lapse — awaiting President's assent
Constitutional Amendment Bill (Any stage)	✓ Does NOT lapse, regardless of the stage
Bill in Joint Sitting (Pending or Decided)	✓ Does NOT lapse if passed; if not concluded, ✗ Lapses

9.JUDICIARY

Supreme Court of India

- **Established** under **Article 124** of the Constitution
- **Chief Justice + max 33 other judges** (total strength: 34)
- Judges are **appointed by the President**
- **Retirement age: 65 years**
- First CJI: **Justice H. J. Kania**
- Has power of **judicial review** and is the **guardian of the Constitution**
- Can **issue writs under Article 32**

High Courts

- Covered under **Articles 214–231**
- Each state has a High Court; some are common to multiple states (e.g. Guwahati, Bombay)
- Judges are **appointed by the President**
- **Retirement age: 62 years**
- Can issue writs under **Article 226** (broader scope than Article 32)

Writs (Articles 32 & 226)

Used to enforce **Fundamental Rights** (and legal rights via Art. 226)

Key Powers of Supreme Court

- **Original Jurisdiction:** Centre vs State disputes (Art. 131)
- **Appellate Jurisdiction:** Appeals from High Courts
- **Advisory Jurisdiction:** Opinion to President (Art. 143)
- **Court of Record:** Can punish for contempt (Art. 129)
- Decisions are **binding on all courts in India**

Other Important Facts

- **Single integrated judicial system**
- Supreme Court = Final interpreter of the Constitution
- **Judges removed only by Parliament via impeachment**
- Number of SC judges decided by **Parliament**
- The **first woman judge of the Supreme Court of India** was **Justice M. Fathima Beevi**.

High Court	States / UTs Covered
Bombay High Court	Maharashtra, Goa, Dadra & Nagar Haveli and Daman & Diu
Guwahati High Court	Assam, Nagaland, Mizoram, Arunachal Pradesh
Kerala High Court	Kerala and Lakshadweep
Kolkata High Court	West Bengal and Andaman & Nicobar Islands
Madras High Court	Tamil Nadu and Puducherry
Punjab & Haryana High Court	Punjab, Haryana and Union Territory of Chandigarh
Jammu & Kashmir and Ladakh High Court	Jammu & Kashmir and Ladakh

10. GOVERNOR

Articles 153 to 162

- The Governor is the **constitutional head of the state**.
- Similar role as the **President at the central level**, but in a **state context**.

Appointment and Tenure

- Appointed by the **President of India**.
- Holds office for a **term of 5 years** but **can be removed earlier** (serves at the **pleasure of the President**).
- Can be **transferred to another state** or **hold office in two or more states** simultaneously (Art. 153 proviso).
- **Eligibility:**
 - Indian citizen
 - At least 35 years old
 - Not hold any office of profit
 - Must not be a Member of Parliament or State Legislature

Powers of the Governor

1. Executive Powers

- **Appoints:**
 - Chief Minister
 - Other ministers (on advice of CM)
 - Advocate General of the State
 - State Election Commissioner
 - Chairman and members of State Public Service Commission
- All **executive actions** are taken in the name of the Governor.

2. Legislative Powers

- Summons, prorogues, and dissolves the **State Legislative Assembly**.
- Can **address the House**, send messages, and **give assent** to bills.
- Can **withhold, approve, or reserve** certain bills for the **President**.
- Lays the **state budget** and annual reports before the legislature.
- **Nominates** 1 member (Anglo-Indian) in Assembly (now repealed by 104th Amendment) and members in Legislative Council if applicable.

3. Financial Powers

- Causes the **Annual Financial Statement** (State Budget) to be laid before the House.
- **Money Bill** can be introduced **only with Governor's prior recommendation**.

4. Judicial Powers

- Appoints judges to **district courts** in consultation with the **High Court**.
- Can grant **pardons, reprieves, respites, or remissions** for offences under state law (Art. 161).

5. Discretionary Powers

- When **no party gets clear majority**, appoints CM using discretion.
- Can **recommend President's Rule** in the state (Art. 356).
- Can reserve a bill for **President's consideration**.
- Acts independently in some cases, e.g. **dismissal of government, dissolution of Assembly**, etc.

11. CHIEF MINISTER & COUNCIL OF MINISTERS

Role of Chief Minister

- **Real executive head** of the state government.
- Appointed by the Governor (usually the leader of the majority party).
- **Heads the Council of Ministers**, advises the Governor.

Council of Ministers

- Assists the CM in governance and decision-making.
- **Collectively responsible to the State Legislative Assembly.**
- Ministers hold office **during the pleasure of the Governor**, but practically until they enjoy majority support in the Assembly.

STATE LEGISLATURE

Structure of Legislature

- **Unicameral:** Most states (only Legislative Assembly – Vidhan Sabha)
- **Bicameral:** Some states (Legislative Assembly + Legislative Council – Vidhan Parishad)
 - States with bicameral: **Uttar Pradesh, Bihar, Maharashtra, Karnataka, Andhra Pradesh, Telangana (Total – 6)**

Legislative Assembly (Vidhan Sabha)

- **Lower House**, directly elected by the people.
- **Tenure:** 5 years (can be dissolved early by Governor).
- **Minimum age** to contest: **25 years**
- More powerful than Legislative Council.

Legislative Council (Vidhan Parishad)

- **Upper House**, partly elected and partly nominated.
- **Permanent body:** 1/3rd members retire every 2 years.
- **Minimum age:** 30 years
- Not all states have a Legislative Council.

COMPARISON: Assembly vs Council (for bicameral states)

Feature	Legislative Assembly	Legislative Council
Tenure	5 years	Permanent, 1/3rd retire every 2 years
Election method	Direct election	Indirect + Nominations
Age to contest	25 years	30 years
Power level	Higher (controls government)	Advisory, Limited role

SSC CGL Key Facts & PYQ-Based Points

- **Governor is appointed by President (Article 155)**
- **Article 153:** Governor for each state
- **Money Bill** can be introduced **only in Assembly with Governor's recommendation**
- CM + Council of Ministers = Real executive (like PM at Centre)
- **State Legislature** is **Unicameral** in most states
- Governor uses **Article 356** to recommend **President's Rule**

12.UNION & ITS TERRITORY

Constitutional Basis:

- Covered under **Part I** of the Constitution
- **Articles 1 to 4**

Article-wise Breakdown:

◆ Article 1 – Name and Territory of the Union

- India, that is **Bharat**, shall be a **Union of States**.
- The territory of India includes:
 1. Territories of the states
 2. Union Territories
 3. Territories that may be acquired in the future

Why “Union” and not “Federation”?

- To indicate **indestructible unity** of India
- States have **no right to secede**

Article 2 – Admission or Establishment of New States

- Parliament may **admit** new states or **establish** new states on terms and conditions it thinks fit.
Example: **Sikkim** was admitted in 1975 under Article 2.

Article 3 – Formation of New States and Alteration of Areas

Parliament can:

- Form a **new state** by separation or uniting territories
- **Increase / Decrease the area** of any state
- **Alter boundaries or names** of existing states

Procedure under Article 3:

- Bill introduced **only with President’s recommendation**
- **Concerned state legislature is consulted**, but **not binding**

Example: Formation of **Telangana** from Andhra Pradesh in 2014.

Article 4 – Laws under Articles 2 and 3 are not Constitutional Amendments

- **No constitutional amendment (under Article 368)** is required to change state boundaries or names.
- Such laws are passed **as ordinary laws** by **simple majority** in Parliament.

SSC CGL Important Facts

Fact	Answer
“India, that is Bharat...” is in Article	Article 1
Parliament can form new states under	Article 3
Admission of new territory is under	Article 2
State legislature’s opinion is	Advisory, not binding
Telangana formed under which article	Article 3
Amendment needed to change name of state?	✗ No (done under Article 3)

Examples of Application:

- **Telangana (2014)**: Formed under Article 3
- **Jammu & Kashmir Reorganization Act (2019)**: Created **J&K and Ladakh** as UTs
- **Sikkim (1975)**: Admitted under Article 2

13. EMERGENCY PROVISIONS

Constitutional Basis

- **Part XVIII (Articles 352 to 360)**
- Provides for suspension/modification of normal governance during extraordinary situations.

- Can be extended **indefinitely** with **6-month renewals**

Types of Emergency in India

Type of Emergency	Article	Also Called
1. National Emergency	Article 352	War, External Aggression, or Armed Rebellion
2. President's Rule	Article 356	State Emergency
3. Financial Emergency	Article 360	Financial Crisis Emergency

SSC CGL Fact:

- **Declared by President** on written advice of **Council of Ministers**
- **Approval within 1 month by both Houses** (Earlier 2 months – changed by 44th Amendment)

2. President's Rule – Article 356

Grounds:

- Failure of constitutional machinery in a state
- Governor sends a report to the President or **President acts without report** (Article 365)

Effects:

- State Assembly may be **dissolved or suspended**
- President administers the state through the Governor
- Parliament makes laws for the state

Duration:

- Initial: **6 months**
- Extendable up to **3 years** with Parliamentary approval every 6 months
- Beyond 1 year: Requires **National Emergency** in effect or **Election Commission's approval**

SSC CGL Fact:

- **Maximum 3 years**, beyond that it's unconstitutional unless special conditions apply
- **Dr. Ambedkar called it a "dead letter"**, but it's been used over **100+ times**

1. National Emergency – Article 352

Grounds:

- War
- External Aggression
- Armed Rebellion (added by 44th Amendment, 1978)

Effects:

- Centre becomes more powerful
- Parliament can make laws on **State List**
- Fundamental Rights under **Article 19 are suspended**
- All money bills are passed by Parliament
- **Duration:**
 - Initially 1 month
 - Approval by both Houses = 6 months

3. Financial Emergency – Article 360

Grounds:

- Threat to financial stability or credit of India

Effects:

- Central control over state financial matters
- Salaries of govt employees (including judges) can be reduced
- All Money Bills must be approved by the President

Duration:

- Once approved, continues indefinitely till revoked
- Never declared in India

SSC CGL Key Takeaways:

- **Article 352:** National Emergency – needs both Houses' approval
- **Article 356:** State Emergency – based on Governor's report
- **Article 360:** Financial Emergency – never used
- **Article 19 Rights suspended during National Emergency only**
- **44th Amendment** made it harder to misuse emergency provisions

Comparison: Emergency Provisions in India

Feature	National Emergency	President's Rule (State Emergency)	Financial Emergency
Article	352	356	360
Grounds	War, External Aggression, Armed Rebellion	Failure of constitutional machinery in a state	Financial instability or credit threat
Declared by	President (on Cabinet's written advice)	President (on Governor's report or otherwise)	President
Effect on Centre-State	Centre can legislate on State List	Centre takes over state administration	Centre controls financial matters of states
Effect on Fundamental Rights	Article 19 suspended	No effect	Salaries of judges, officials can be reduced
Parliamentary Approval	Within 1 month, then every 6 months	Within 2 months, then every 6 months	Within 2 months
Duration	Can continue indefinitely (renewable)	Max 3 years (with special conditions)	Indefinite once approved
Impact on Judiciary	Can suspend enforcement of rights	No impact	Salaries of judges can be reduced
Use in India	3 times (1962, 1971, 1975)	100+ times	Never used

14. CONSTITUTIONAL AMENDMENT

What is a Constitutional Amendment?

A **constitutional amendment** is a formal change or addition to the provisions of the Constitution of India. The power to amend lies with the **Parliament** under **Article 368**.

Article 368 – Procedure for Amendment

Provides two things:

1. **Power of Parliament** to amend the Constitution
2. **Types of amendments**

Types of Amendments

Type	Procedure	Examples
1. By Simple Majority	Like ordinary law. Not under Article 368.	Creation of new states, salaries, etc.
2. By Special Majority	Majority of total membership + 2/3rd present & voting (under Article 368)	Fundamental Rights, DPSP changes
3. By Special Majority + State Ratification	Special Majority + consent of half of the states (under Article 368)	Federal provisions (e.g., election of President, SC/HC powers, etc.)

Examples of Each Type:

Simple Majority (outside Art. 368)

- Creation/abolition of Legislative Councils
- Changes to Schedules
- Names/Boundaries of states

Special Majority

- Fundamental Rights
- Directive Principles
- President's Rule provisions

Special Majority + Half of State Ratification

- Election of President
- Extent of executive power of the Union/States
- SC/HC jurisdiction
- Representation of states in Parliament

Important Constitutional Amendments

Amendment	Year	Key Feature
1st	1951	Added restrictions to Freedom of Speech (Article 19), validated zamindari laws
42nd	1976	" Mini Constitution ": Added Socialist, Secular , strengthened DPSPs, curtailed FRs
44th	1978	Restored Article 19 rights, limited Emergency powers
52nd	1985	Anti-defection law added (10th Schedule)
61st	1989	Reduced voting age from 21 to 18 (Article 326)
69th	1991	Delhi made NCT with Legislative Assembly
73rd	1992	Panchayati Raj made constitutional (Part IX, 11th Schedule)
74th	1992	Urban Local Bodies (Municipalities) added (Part IX-A, 12th Schedule)
86th	2002	Added Article 21A – Right to Education (6–14 years)
91st	2003	Strengthened anti-defection law ; limited size of Council of Ministers
101st	2016	Introduced Goods and Services Tax (GST)
102nd	2018	Gave constitutional status to National Commission for Backward Classes (NCBC)
103rd	2019	10% EWS reservation in jobs and education
104th	2020	Abolished Anglo-Indian nomination in Lok Sabha and State Assemblies
105th	2021	Restored states' power to identify SEBCs (Socially and Educationally Backward Classes)
106th	2023	Provided 33% reservation for women in Lok Sabha and State Assemblies (Women's Reservation Bill)

SSC CGL Key Points

- **Article 368**: Amendment procedure
- No state can **initiate** an amendment
- SC in **Kesavananda Bharati Case (1973)** ruled:
 - Parliament can amend Constitution
 - But **cannot alter the Basic Structure**

Basic Structure Doctrine (can't be amended)

- Supremacy of the Constitution
- Rule of Law
- Judicial review
- Parliamentary system
- Free and fair elections
- Federalism
- Secularism, democracy, republic

15.CONSTITUTIONAL BODIES

Body	Article	Established by	Appointed by	Key Function
Election Commission (ECI)	Art. 324	Constitution	President	Conducts elections to Parliament, State Legislatures, President, and Vice President
Union Public Service Commission (UPSC)	Art. 315–323	Constitution	President	Recruitment to All-India and Central Services
State Public Service Commission (SPSC)	Art. 315–323	Constitution	Governor	Recruitment to State Services
Finance Commission	Art. 280	Constitution	President	Recommends financial distribution between Centre and States
Comptroller & Auditor General (CAG)	Art. 148	Constitution	President	Audits accounts of Union and States
Attorney General of India	Art. 76	Constitution	President	Chief legal advisor to the Government of India
Advocate General of State	Art. 165	Constitution	Governor	Chief legal advisor to the State Government
Special Officer for Linguistic Minorities	Art. 350B	Constitution	President	Reports on linguistic minority rights
National Commission for SCs	Art. 338	Constitution (89th Amend.)	President	Protects interests of Scheduled Castes
National Commission for STs	Art. 338A	Constitution (89th Amend.)	President	Protects interests of Scheduled Tribes
National Commission for Backward Classes (NCBC)	Art. 338B	Constitution (102nd Amend.)	President	Safeguards interests of OBCs
GST Council	Art. 279A	Constitution (101st Amend.)	President (Chair: FM)	Recommends GST rates and policies
Consolidated Fund of India (Not a body)	Art. 266	Constitution	—	All govt. revenue goes into it

SSC CGL Pointers:

- Only **President** can appoint most constitutional bodies.
- **Finance Commission** is appointed **every 5 years**.
- **CAG** reports are submitted to **President/Governor** who places them in Parliament/Assembly.
- **Attorney General** is **not a government servant** but enjoys privileges of an MP.

ATTORNEY GENERAL OF INDIA (AGI)

Article: 76

- **Chief legal advisor** to the Government of India
- Appointed by: **President**
- Must be qualified to be a **Judge of the Supreme Court**
- Tenure: **No fixed term** (holds office during pleasure of President)

Powers & Functions:

- Advises Govt. of India on **legal matters**
- Appears in **Supreme Court/High Court** on behalf of the government
- Can **attend Parliament proceedings but cannot vote**
- Has the **right of audience** in all courts in India
- Not a full-time government servant – can take private practice with restrictions

SSC CGL Tips:

- **AGI = Highest legal officer of the country**
- **Can speak but cannot vote** in Parliament

COMPTROLLER AND AUDITOR GENERAL (CAG)

Article: 148

- Guardian of **public purse**; audits accounts of Union and State governments
- Appointed by: **President**
- Term: **6 years or up to 65 years of age**, whichever is earlier
- **Removal: Same as SC judge** (through impeachment)

Functions:

Audits :

1. Union and state govt. expenditures
2. Government-owned companies
3. Receipts and expenditures of bodies substantially financed by government
 - Reports are submitted to:
 - **President** (for Union)
 - **Governor** (for States)

SSC CGL Tips:

- Called the “**Watchdog of Public Finance**”
- Does **not audit private companies**
- Removal = **same process as SC judge**

FINANCE COMMISSION (FC)

Article: 280

- Constituted **every 5 years** by the **President**
- Chairman + 4 members
- Latest: **15th Finance Commission** (2021–2026), chaired by **N.K. Singh**

◆ Functions:

- **Recommends distribution of taxes** between Centre and States
- Suggests principles for grants-in-aid from Centre to States
- **Evaluates financial status of panchayats & municipalities** (after 73rd/74th Amendments)

SSC CGL Tips:

- FC is **advisory**, not binding
- Deals with **vertical (Centre–State)** and **horizontal (State–State)** distribution
- Appointed by **President only**

16.SCHEDULES

Schedule	Details
1st	Names and territorial extent of States and Union Territories
2nd	Salaries and allowances of President, Governors, Judges, CAG, MPs, MLAs, etc.
3rd	Forms of oaths or affirmations for Union and State ministers, MPs, Judges, etc.
4th	Allocation of Rajya Sabha seats among States and Union Territories
5th	Provisions for administration and control of Scheduled Areas and Tribes (except NE states)
6th	Provisions for tribal areas in Assam, Meghalaya, Tripura, and Mizoram
7th	Division of powers between Union and States: Union List, State List, and Concurrent List
8th	22 Official Languages (added via 21st, 71st, 92nd, 96th Amendments)
9th	Land reform and other laws placed beyond judicial review (added by 1st Amendment, 1951)
10th	Anti-defection provisions for disqualification of MPs and MLAs (added by 52nd Amendment, 1985)
11th	Powers, authority, and responsibilities of Panchayats (added by 73rd Amendment, 1992)
12th	Powers, authority, and responsibilities of Municipalities (added by 74th Amendment, 1992)

Important Amendments Related to Official Language (8th Schedule)

Amendment	Year	Key Provision
21st Amendment Act	1967	Added Sindhi to the 8th Schedule , increasing the number of official languages from 14 to 15 .
71st Amendment Act	1992	Added Konkani, Manipuri, and Nepali to the 8th Schedule – total became 18 languages.
92nd Amendment Act	2003	Added Bodo, Dogri, Maithili, and Santhali – raising the total to 22 languages .
96th Amendment Act	2011	Changed the spelling of " Oriya " to " Odia " in the 8th Schedule (Article 344 & 351).

Other important facts

10th Schedule

- Defines **voluntary resignation** and **disqualification grounds**, **Speaker decides disqualification** (subject to judicial review)

9th Schedule

- Judicial immunity removed by I.R. Coelho case (2007)**
- Used to protect **land reforms**, now under **judicial review**

18.HISTORICAL BACKGROUND

1. Regulating Act, 1773

- First step by British to **control East India Company**
- Created **Governor-General of Bengal** (Warren Hastings)
- First time **British Parliament** interfered in Indian affairs

2. Pitt's India Act, 1784

- Established **Board of Control** (for political control)
- Company = commercial work; British govt = political affairs
- Marked the **dual control system**

3. Charter Acts (1813, 1833, 1853)

- **1813:** Ended East India Company monopoly in trade (except tea & China)
- **1833:** Created **Governor-General of India** (Lord William Bentinck)
- **1853:**
 - Introduced **competitive exams** for civil services
 - Separated **legislative & executive functions** of Governor-General's council

4. Government of India Act, 1858

- After **Revolt of 1857**, British Crown took over rule from Company
- Created post of **Secretary of State for India**
- Governor-General = **Viceroy of India** (first: Lord Canning)

5. Indian Councils Act, 1861

- Introduced **Indians in legislation** for the first time (non-official members)
- Established **legislative councils** at Centre and Provinces

6. Indian Councils Act, 1892

- Allowed **discussion of budget**
- Introduced **indirect elections**

7. Indian Councils Act, 1909 (Morley-Minto Reforms)

- Introduced **communal electorates** (Muslims)
- First time **Indians in executive councils** (Satyendra Prasad Sinha)

8. Government of India Act, 1919 (Montagu-Chelmsford Reforms)

- Introduced **diarchy** at provincial level (reserved + transferred subjects)
- **Bicameral legislature** at Centre (Council of State & Legislative Assembly)
- Provincial subjects divided: **Reserved** (Governor), **Transferred** (ministers)

9. Government of India Act, 1935

- Most **important pre-independence Act**
- Basis for **many parts of Indian Constitution**
- **All-India Federation** (never implemented)
- **Provincial Autonomy** (abolished diarchy at provinces)
- **Diarchy at Centre** (never implemented)
- Introduced **Federal Court (1937)**
- **Bicameralism in more provinces**

10. Indian Independence Act, 1947

- Ended British rule in India
- Created **two independent dominions:** India and Pakistan
- Constituent Assemblies given **legislative powers**
- **Governor-General** continued as **constitutional head**
- India became **independent on 15 August 1947**

19.BORROWED PROVISIONS

Country	Borrowed Features
United Kingdom	- Parliamentary system of government - Rule of law - Single citizenship - Speaker and his role - First-past-the-post system - Writs under Article 32 - Cabinet system of government
United States	- Written Constitution - Separation of powers - Judicial review - Fundamental Rights - Preamble - Independence of judiciary - Impeachment of President - Vice-President post
Ireland	- Directive Principles of State Policy (DPSPs) - Method of Presidential election - Nomination of Rajya Sabha members
Canada	- Federal system with strong Centre - Residuary powers with Centre - Appointment of Governors - Advisory jurisdiction of SC
Australia	- Concurrent List - Freedom of trade and commerce - Joint sitting of Parliament
USSR (Russia)	- Fundamental Duties - Socialist principles in Preamble (Justice: social, economic, political)
France	- Ideals of Liberty, Equality, Fraternity in Preamble
Germany (Weimar)	- Emergency provisions
South Africa	- Amendment procedure of Constitution - Election of Rajya Sabha members
Japan	- Procedure established by law (Article 21)

17.PARTS OF INDIAN CONSTITUTION

Part	Subject	Articles
Part I	Union and its Territory	Articles 1 to 4
Part II	Citizenship	Articles 5 to 11
Part III	Fundamental Rights	Articles 12 to 35
Part IV	Directive Principles of State Policy (DPSP)	Articles 36 to 51
Part IV-A	Fundamental Duties (added by 42nd Amendment)	Article 51A
Part V	The Union Government	Articles 52 to 151
Part VI	The State Governments	Articles 152 to 237
Part VII	● Repealed (7th Amendment Act, 1956)	—
Part VIII	Union Territories	Articles 239 to 242
Part IX	Panchayats (73rd Amendment, 1992)	Articles 243 to 243O
Part IX-A	Municipalities (74th Amendment, 1992)	Articles 243P to 243ZG
Part IX-B	Co-operative Societies (97th Amendment, 2011)	Articles 243ZH to 243ZT
Part X	Scheduled and Tribal Areas	Articles 244 to 244A
Part XI	Relations between Union and States	Articles 245 to 263
Part XII	Finance, Property, Contracts, and Suits	Articles 264 to 300A
Part XIII	Trade, Commerce and Intercourse within India	Articles 301 to 307
Part XIV	Services under the Union and the States	Articles 308 to 323
Part XIV-A	Tribunals (added by 42nd Amendment, 1976)	Articles 323A to 323B
Part XV	Elections	Articles 324 to 329A
Part XVI	Special Provisions for SCs, STs, OBCs, and minorities	Articles 330 to 342
Part XVII	Official Language	Articles 343 to 351
Part XVIII	Emergency Provisions	Articles 352 to 360
Part XIX	Miscellaneous	Articles 361 to 367
Part XX	Amendment of the Constitution	Article 368

Part	Subject	Articles
Part XXI	Temporary, Transitional, and Special Provisions	Articles 369 to 392
Part XXII	Short Title, Commencement, Repeal	Articles 393 to 395

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HISTORY

INDUS VALLEY CIVILIZATION

Also called **Harappan Civilization**

 **Time Period: c. 2500 BCE – 1750 BCE**

 **Bronze Age urban culture**

 **Discovery of IVC**

Site	Year	Discoverer
Harappa	1921	Daya Ram Sahni
Mohenjo-daro	1922	R.D. Banerji

 First site discovered: **Harappa**, which gave the civilization its name.

 **Geographical Spread**

- Covered **northwest India** and **Pakistan**
- Main rivers: **Indus, Ravi, Ghaggar-Hakra, Sutlej**
- Area extended from **Manda (J&K)** in north to **Daimabad (Maharashtra)** in south

 **Major IVC Sites & Features**

Site	Location	Important Finds
Harappa	Punjab, Pakistan	Granary, cemetery, male torso, seals
Mohenjo-daro	Sindh, Pakistan	Great Bath, Dancing Girl, Priest King
Dholavira	Gujarat, India	Signboard with Indus script, water tanks, (UNESCO site – 2021)
Lothal	Gujarat, India	Dockyard , fire altar, rice evidence
Kalibangan	Rajasthan	Fire altars, Bangles , ploughed field

Site	Location	Important Finds
Rakhigarhi	Haryana	Largest site in India , burial remains
Banawali	Haryana	Barley grains, toy plough, jewelry
Daimabad	Maharashtra	Bronze chariot (controversial IVC link)
Manda	J&K	Northernmost site

Town Planning Features

- **Grid pattern:** roads at right angles
- Use of **burnt bricks** (standard size)
- **Well-planned drainage system**
- Divided into: **Citadel (upper) & Lower town**

 **Economy**

- **Agriculture:** Wheat, barley, **cotton** (1st to grow), dates
- **Trade:**
 - Internal: barter system
 - Foreign: Mesopotamia (evidence of Indus seals there)
- **Crafts:** Bead-making, pottery, seal-making
- **Metals:** Copper, bronze, gold, silver **(no iron)**

UNESCO World Heritage Sites (IVC)

Site	Declared Year	Country
Mohenjo-daro	1980	Pakistan
Dholavira	2021	India

Animals Known and Unknown

Known Animals	Unknown Animals
Humped bull, buffalo, dog, sheep, goat, elephant, rhinoceros	Horse (no evidence found)

Unicorn motif on seals is **mythical**,
Snake worship may have existed

Religion and Beliefs

- **No temples** found
- Worship of:
 - **Mother Goddess** (fertility)
 - **Pashupati Seal** (proto-Shiva)
 - Sacred trees (Peepal), animals, fire altars
- Evidence of **burial practices**, few cremations

Script and Language

- **Undeciphered script**, written mostly on seals
- Likely **pictographic**
- Script written from **right to left**, sometimes boustrophedon

Art and Culture

- **Sculptures:** **Dancing Girl (bronze)**, Priest King (stone)
- **Seals:** Used for trade, animal motifs
- **Pottery:** Painted red and black pottery
- Use of **weights and measures:** binary system (16-based)

Decline Theories

- **Floods** or tectonic activity (changing river courses)
- **Decline in trade** with Mesopotamia
- **Drought** or climate change
- **Invasion theory** (Aryans) – now outdated

Quick Facts for SSC CGL

- **First site discovered:** Harappa (1921)
- **First Indian site excavated post-independence:** Ropar (Punjab)
- **Largest site overall:** Mohenjo-daro (Pakistan)
- **Largest site in India:** Rakhigarhi (Haryana)
- **Only site with evidence of rice:** Lothal
- **Dockyard evidence:** Lothal
- **Water management:** Dholavira
- **No iron or horse found**

VEDIC AGE (EARLY & LATER VEDIC)

- **Period:** c. 1500 BCE – 600 BCE
- **Sources:**
 - **Early Vedic: Rig Veda** (oldest text, c. 1500–1000 BCE)
 - **Later Vedic: Sama, Yajur, Atharva Vedas, Brahmanas, Aranyakas, Upanishads**

Early Vedic Period (c. 1500 – 1000 BCE)

- No temples or idol worship
- Rituals done via fire (yajnas)

Geography:

- Aryans settled in the **Saptasindhu** region (Punjab, Haryana)

Society:

- **Tribal society**, no rigid varna system
- Family was patriarchal
- Women had **important status** (could attend sabha/samiti, compose hymns)

Polity:

- **Tribal kings (Rajan)** with limited powers
- Important assemblies: **Sabha** and **Samiti**
- No large kingdoms, **tribal units (Jana)** were common

Economy:

- **Pastoral economy**, cattle = wealth
- Some agriculture (barley)
- **No coins**, no taxes, **barter system**
- Iron not used



Religion:

- Worship of **natural forces**: Indra (rain), Agni (fire), Varuna (cosmic order)

Later Vedic Period (c. 1000 – 600 BCE)

Geography:

- Aryans expanded to **Ganga-Yamuna Doab** region

Society:

- **Varna system** became rigid
- Rise of **patriarchy**, decline in women's status

- Fourfold society: Brahmins, Kshatriyas, Vaishyas, Shudras

- **Gotra system** emerged

Polity:

- Rise of **hereditary kingship**
- Larger kingdoms (Mahajanapadas emerged later)

- Importance of **Purohita** and **Senani** increased

- Sabha and Samiti lost power

Economy:

- **Agriculture** became dominant

- Iron (called **Shyama Ayas**) used for tools and ploughing

- **Taxes (Bali)** collected by king

- Use of **coins (Nishka)** started
- Craftsmanship and trade increased

Religion:

- **Gods like Vishnu and Rudra (Shiva)** became prominent

- Rise in **rituals and sacrifices (yajnas)**
- Priests gained more power
- Upanishads introduced **philosophical ideas** (karma, moksha, soul)

Comparison Table: Early vs Later Vedic Age

Feature	Early Vedic Age	Later Vedic Age
Geography	Punjab, NW India (Saptasindhu)	Ganga-Yamuna Doab
Economy	Cattle rearing, limited agriculture	Agriculture dominant, iron use starts
Society	Tribal, women respected, no varnas	Rigid varna system, women's status declined
Polity	Rajan elected, Sabha & Samiti strong	Hereditary kings, priests powerful
Religion	Nature gods, fire worship	Philosophical ideas, rituals increased
Iron Usage	✗ Not known	✓ Used (Shyama Ayas)
Coins	✗ No coins, barter system	✓ Nishka coins in use
Women's Role	Could compose hymns, attend assemblies	Denied rituals, status lowered

MAHAJANAPADAS

Background

- After the Later Vedic Age, small kingdoms (Janapadas) expanded into **Mahajanapadas**
- Mentioned in **Buddhist (Anguttara Nikaya)** and **Jain texts (Bhagavati Sutra)**
- There were **16 Mahajanapadas** in Northern India

Importance of Mahajanapadas

- **First large political units** in Indian history
- **Coins** (punch-marked silver) first issued
- Rise of **urban centres** (Rajgir, Ujjain, Kaushambi)
- Period of **religious reform**: rise of **Buddhism and Jainism**
- Precursor to **Mauryan Empire**

Types of Governance

- **Monarchies:** Magadha, Kosala, Avanti, Vatsa
- **Republics (Ganasanghas):** Vajji, Malla, Kamboja, Lichchhavis, Sakyas
 - **Republics were ruled by councils** or elected representatives
 - Decisions made by consensus or voting

Magadha – Most Powerful Mahajanapada

- Became dominant due to:
 - **Rich iron mines of Rajmahal Hills**
 - **Fertile Gangetic plains**
 - Strong army and efficient administration

Famous rulers:

- **Bimbisara** (Haryanka dynasty)
- **Ajatashatru** (used war chariots, fortified Rajgir)
- **Mahapadma Nanda** (Nanda dynasty)

Exam Facts to Remember:

- **Buddha born in Sakya clan** (Republic)
- **First Republic** in the world (claimed): **Vajji Confederacy**
- **Ashmaka: Only southern Mahajanapada**
- **Magadha became the core of Mauryan Empire later**

No.	Mahajanapada	Capital	Modern Location	No.	Mahajanapada	Capital	Modern Location
1	Magadha	Rajagriha	Bihar	10	Chedi	Shuktimati	Bundelkhand region
2	Kosala	Shravasti	Eastern UP	11	Kuru	Indraprastha	Delhi-Haryana
3	Vatsa	Kaushambi	Allahabad (UP)	12	Panchala	Ahichchhatra	Western UP
4	Avanti	Ujjayini	Madhya Pradesh	13	Surasena	Mathura	Western UP
5	Anga	Champa	Bihar	14	Ashmaka	Potana/Paudanya	Andhra Maharashtra border
6	Kashi	Varanasi	UP	15	Gandhara	Taxila	Pakistan (NWFP)
7	Videha	Mithila	Bihar-Nepal border	16	Kamboja	Rajapura	Afghanistan border area
8	Malla	Kushinagar	Eastern UP				
9	Vajji	Vaishali	North Bihar				

BUDDHISM & JAINISM

Jainism

✦ Founder: **Rishabhanatha (1st Tirthankara)**

• **Vardhamana Mahavira (24th Tirthankara) is the real founder**

- Born in **540 BCE**, Bihar
- Attained **Kaivalya (enlightenment)** at 42, died at 72 in Pavapuri

Main Teachings:

Concept	Meaning
Ahimsa	Non-violence (core of Jain ethics)
Aparigraha	Non-possession
Anekantavada	Multiplicity of truth
Triratna (Three Jewels)	Right belief, Right knowledge, Right conduct

- Denied Vedas, God, and rituals
- **Strict asceticism**
- Supported by traders and urban elites

Sects of Jainism:

Sect	Features
Shwetambaras	White-clad , allowed women monks
Digambaras	Sky-clad (nude) , more austere

Buddhism

Founder: **Siddhartha Gautama (Buddha)**

- Born **in Lumbini**, 563 BCE
- Attained enlightenment at **Bodh Gaya**
- Gave first sermon at **Sarnath** (Dharmachakra Pravartana)
- **Died at Kushinagar** (Mahaparinirvana)

Core Teachings:

Concept	Explanation
Four Noble Truths	Life is suffering (Dukkha), cause is desire, can be ended, follow Eightfold Path
Eightfold Path	Right view, intention, speech, action, livelihood, effort, mindfulness, concentration

Concept	Explanation
Middle Path	Avoid extremes of luxury and hardship
Ahimsa	Non-violence to all living beings

- Denied authority of Vedas, caste system, and rituals

- Belief in rebirth and karma, but no permanent soul

Sects of Buddhism:

Sect	Belief
Hinayana	Original form, individual salvation, Buddha as teacher
Mahayana	Worship Buddha as god, salvation for all
Vajrayana	Later tantric form, rituals and mantras

Buddhist Councils:

Council	Held By	Place	Outcome
1st	Ajatashatru	Rajgriha	Compilation of teachings
2nd	Kalashoka	Vaishali	Division into Hinayana/Mahayana
3rd	Ashoka	Pataliputra	Spread to Sri Lanka
4th	Kanishka	Kashmir	Mahayana established

Summary Comparison: Buddhism vs Jainism

Aspect	Buddhism	Jainism
Founder	Gautama Buddha	Mahavira (24th Tirthankara)
God/Creator	Denied existence	Denied existence
Soul (Atma)	Denied permanent soul (Anatta)	Believed in permanent soul (Jiva)
Non-violence	Important, but moderate	Most extreme , no harm even to insects
Salvation path	Middle path	Severe asceticism
Language	Pali	Prakrit
Followers	Kings, masses	Traders, merchants

MAURYAN EMPIRE

Key Rulers of the Mauryan Dynasty

Chandragupta Maurya (321–297 BCE)

- Founder of the empire with help from **Chanakya (Kautilya)**, author of **Arthashastra**
- Defeated **Dhana Nanda** and **Seleucus I** (Alexander's general)
- **Megasthenes**, Greek ambassador, visited his court → wrote "**Indica**"
- Adopted **Jainism**, died at **Shravanabelagola** (Karnataka)

Bindusara (297–273 BCE)

- Son of Chandragupta
- Extended empire south up to Karnataka

- Known as **Amitraghata** (Slayer of enemies)
- Greek ambassador **Deimachus** visited his court
- Follower of the **Ajivika sect**

Ashoka the Great (273–232 BCE)

- Fought **Kalinga War** (261 BCE) → turned to **Buddhism** and **Dhamma**
- Spread Dhamma through edicts and moral governance
- Sent **Buddhist missions to Sri Lanka, SE Asia**
- Famous for **Ashokan edicts** and **Sarnath Lion Capital** (India's emblem)

Major Rock Edicts of Ashoka (14 Total)

Edict No.	Key Messages
I	Ban on animal sacrifice
II	Medical care for people & animals; road building
III	Respect for elders, generosity to Brahmins & ascetics
IV	Timelessness of Dhamma
V	Appointment of Dhamma Mahamatras
VI	Communication of orders, Ashoka's openness
VII	Religious tolerance
VIII	Dhamma Yatras initiated
IX	Criticism of rituals, focus on morality
X	Disinterest in fame, focus on moral victories
XI	Dhamma brings welfare in this life & next
XII	Strongest call for religious harmony
XIII	Kalinga war and Ashoka's remorse → adopted Dhamma
XIV	Same Dhamma message in different languages and scripts

Important Edict Sites

Site	Location	Significance
Kalsi	Uttarakhand	Only site in North India with major edicts
Dhauli & Jaugada	Odisha	Mention of Kalinga war
Girnar	Gujarat	All 14 major edicts
Shahbazgarhi & Mansehra	Pakistan	Edicts in Kharosthi script

Ashoka's Dhamma – Moral Code

Principle	Meaning
Ahimsa	Non-violence to humans and animals
Religious tolerance	Respect to all sects and beliefs
Dhamma Mahamatras	Officials to spread moral teachings
Dhamma Yatras	Moral tours to connect with common people
Respect for elders	Ethics in family, society, and governance
Public welfare	Tree planting, hospitals, rest houses

Mauryan Administration

Structure:

- Highly centralized monarchy
- Based on Arthashastra (by Kautilya) and Ashokan edicts
- Empire divided into provinces ruled by Kumaras (royal princes)

Officer	Role
Purohita	Royal priest and spiritual guide
Mantri Parishad	Council of ministers

Central Officials

Officer	Role
Amatya	Minister to the king
Mahamatya	Senior officer, supervisor of other officials
Senapati	Army commander

Revenue & Economy Officers

Officer	Function
Samaharta	Chief revenue collector
Sannidhata	Treasurer, head of royal treasury
Panyadhyaksha	Market and trade controller

Officer	Function
Navadhyaksha	Overseer of shipping and water transport
Sitradhyaksha	Officer of agriculture

Justice & Law Enforcement

Officer	Function
Rajuka	District magistrate, also did land surveys
Pradeshika	Provincial governor, reports directly to king
Gopa	Village accountant and administrator
Dandapala	Police chief (punishment authority)

Special Purpose Officials

Officer	Function
Dhamma Mahamatras	Spread moral code and resolve public disputes
Yuktas	Record keepers and junior clerks
Antapala	Border security official
Tirthapalas	Road and route supervisors

Mauryan Economy

- Agriculture: backbone of revenue
- Land revenue (Bhaga) = 1/6th of produce

- Use of punch-marked silver coins
- Trade flourished; roads & rest houses for travelers
- State-owned industries: textiles, mines

Art & Architecture

- Ashokan Pillars: polished sandstone, animal capitals (Lion at Sarnath)
- Stupas: Sanchi, Bharhut
- Rock-cut caves: Barabar hills for Ajivika sect
- Mauryan polish: mirror-like stone finish

Decline of the Mauryan Empire

Reason
Weak successors post-Ashoka
Financial stress due to welfare state
Provincial revolts and decentralization
Last ruler Brihadratha killed by Pushyamitra Shunga in 185 BCE

Quick Summary Table

Ruler	Key Points
Chandragupta	Founder, Jainism, defeated Seleucus, advised by Chanakya
Bindusara	Expansionist, Ajivika follower, Deimachus visited
Ashoka	Kalinga War, Dhamma, Buddhism, Edicts, Lion Capital

GUPTA EMPIRE (c. 319 – 550 CE)

Known as the “Golden Age of Ancient India”

Capital: **Pataliputra** (initially) and **Ujjain**

👑 Key Rulers of the Gupta Dynasty

■ **Sri Gupta** (c. 240–280 CE)

- Founder of Gupta dynasty (not empire)
- Likely a feudatory under Kushanas

■ **Chandragupta I** (c. 319–335 CE)

- Real founder of **Gupta Empire**
- Married **Kumaradevi** (Lichchhavi princess)
→ Gained political strength in eastern India
- Issued **gold coins (Dinars)** with king and queen images
- Took the title **Maharajadhiraja**

■ **Samudragupta** (c. 335–375 CE)

- Known as “**Napoleon of India**” – by historian **V.A. Smith**
- Expanded empire via wars (North India annexed, South India defeated but spared)
- **Prayag Prashasti** (Allahabad Pillar Inscription) by **Harishena** → records his conquests
- Patron of arts and literature, a skilled poet and musician (seen on coins with veena)
- Performed **Ashvamedha Yajna**

■ **Chandragupta II (Vikramaditya)** (c. 375–415 CE)

- Conquered **Western India (Malwa, Gujarat)** by defeating **Shakas**
- Capital shifted to **Ujjain**
- Patron of **Kalidasa** and **Navaratnas**
- Chinese traveler **Fa-Hien** visited India during his reign

■ **Kumaragupta I** (c. 415–455 CE)

- Founded **Nalanda University**
- Worshipped **Lord Kartikeya (Skanda)**
- Faced initial **Huna invasions**

■ **Skandagupta** (c. 455–467 CE)

- Successfully repelled **Hunas (White Huns)**
- After him, the empire weakened

Gupta Administration

Aspect	Details
Type of Rule	Central monarchy with feudal elements
King's Title	Maharajadhiraja, Vikramaditya
Council of Ministers	Mantri Parishad , advisors to king
Provinces	Called Bhuktis , headed by Uparikas

Aspect	Details
Districts (Vishayas)	Headed by Vishayapatis
Village Administration	Gramika led village councils
Land Grants	Brahmadeya grants to Brahmins, leading to feudalism

Gupta Officials

Officer	Function
Kumaramatyas	High-ranking officers, often from royalty
Sandhivigrahika	Minister of war and peace
Dandika	Chief justice or law officer
Vishayapati	Head of Vishaya (district)

Economy

- **Agriculture:** Mainstay; land tax was major source of revenue
- **Trade:** Internal & external (with Roman Empire, SE Asia); decline after fall of Roman Empire
- **Coinage:** Gold coins (Dinars), silver coins; copper coins also used
- **Artisans & guilds:** Continued but urban centers declined slowly

Art, Culture, and Literature

Field	Contribution
Literature	Kalidasa (Abhijnanasakuntalam, Meghadutam),

Field	Contribution
	Vishakhadatta (Mudrarakshasa), Bhasa
Sanskrit	Became language of elite and administration
Architecture	Temple architecture began – shikharas, mandapas
Sculpture	Mathura and Sarnath schools flourished
Paintings	Ajanta Caves frescoes (Maharashtra)
Religion	Rise of Brahmanism and Vaishnavism , tolerance of Buddhism and Jainism

Science and Education

Scholar	Field	Contribution
Aryabhata	Astronomy, Math	Earth rotates on axis, π value, algebra
Varahamihira	Astronomy, Astrology	<i>Brihat Samhita</i>
Charaka & Sushruta	Medicine	Surgery, herbal medicine
Nalanda University	Bihar	World-renowned center of Buddhist learning

Foreign Accounts

Visitor	From	Visited Whom	Notes
Fa-Hien	China	Chandragupta II (Vikramaditya)	Buddhist pilgrim; praised law, society, prosperity

Decline of Gupta Empire

Reasons
Huna invasions weakened the empire
Rise of feudalism and weakening central power
Later Guptas were weak and ruled small areas only
Trade decline, loss of revenue

Quick Summary Table of Key Rulers

Ruler	Key Contributions
Chandragupta I	Founded Gupta Empire, Lichchhavi alliance
Samudragupta	Conqueror, poet, Prayag Prashasti, Ashvamedha
Chandragupta II	Shaka conqueror, Fa-Hien visit, Kalidasa patron
Kumaragupta	Founded Nalanda University, Kartikeya worship
Skandagupta	Defeated Hunas, last powerful Gupta

DELHI SULTANATE (1206-1526 CE)

- First major Islamic rule in India
- Founded after Muhammad Ghori's death (he had no heirs)
- Capital: Delhi
- Ruled by five different dynasties

Dynasties of Delhi Sultanate

Dynasty	Period	Founders
Mamluk (Slave)	1206–1290	Qutb-ud-din Aibak
Khilji	1290–1320	Jalal-ud-din Khilji

Dynasty	Period	Founders
Tughlaq	1320–1414	Ghiyas-ud-din Tughlaq
Sayyid	1414–1451	Khizr Khan
Lodi	1451–1526	Bahlul Lodi

Key Rulers and Contributions

■ Mamluk Dynasty (1206–1290)

Founder: Qutb-ud-din Aibak

- Slave of Muhammad Ghori
- Built **Quwwat-ul-Islam Mosque & started Qutb Minar**
- Died while playing polo
- His successor **Iltutmish** consolidated the empire
 - Introduced **Iqta system**
 - Made Delhi official capital
 - Recognized by **Caliph of Baghdad**

Razia Sultana (1236–1240)

- **First and only female** ruler of Delhi Sultanate
- Faced nobles' opposition, ultimately killed

■ Khilji Dynasty (1290–1320)

Founder: Jalal-ud-din Khilji

Most powerful: **Alauddin Khilji**

- Conquered Gujarat, Ranthambore, Chittor, and south India (via Malik Kafur)
- Introduced **price control, market reforms**, and **spy system**
- Maintained a large standing army
- Prevented Mongol invasions

■ Tughlaq Dynasty (1320–1414)

Founder: **Ghiyas-ud-din Tughlaq**

Notable ruler: **Muhammad bin Tughlaq**

- Shifted capital from **Delhi to Daulatabad** → failed
- Introduced **token currency** → copper coins → failed
- Known for **ambitious but impractical** policies
Firoz Shah Tughlaq
- Constructed **canals, gardens, hospitals, schools**
- Patron of architecture and Sanskrit translation
- Built **Firoz Shah Kotla**

■ Sayyid Dynasty (1414–1451)

- Weak dynasty, considered **vassals of Timur**
- **Khizr Khan** was the founder
- Rule limited to Delhi and nearby areas

■ Lodi Dynasty (1451–1526)

Founder: Bahlul Lodi (Afghan dynasty)

Sikandar Lodi

- Founded **Agra**
- Promoted agriculture, built roads
Ibrahim Lodi
- Last ruler; unpopular among nobles
- Defeated by **Babur in 1526 at First Battle of Panipat**

Administration of Delhi Sultanate

Feature	Description
Centralized monarchy	Sultan was supreme authority

Feature	Description
Iqtadari system	Land given to nobles (Iqtas) in return for services
Diwan-i-Wazarat	Finance department
Diwan-i-Ariz	Military department
Diwan-i-Insha	Correspondence & records
Diwan-i-Qaza	Judicial head
Barid	Intelligence system

Economy

- **Agriculture:** Main economic activity; land tax (1/3rd of produce)
- **Trade:** Internal and foreign (Silk, spices, horses)
- **Coinage:** Introduced by Iltutmish (silver Tanka, copper Jital)
- **Market reforms:** Alauddin Khilji's famous price control measures
- **Land revenue:** Measured and collected under various systems

Culture and Architecture

Aspect	Highlights
Architecture	Arches, domes, minarets (Indo-Islamic style)
Monuments	Qutb Minar, Alai Darwaza, Hauz Khas, Firoz Shah Kotla

Aspect	Highlights
Language	Persian was court language
Literature	Amir Khusrau (poet & musician), Ziauddin Barani (historian)
Music	Amir Khusrau → Sitar, Tabla, Qawwali evolved

Decline of the Sultanate

Reason
Rise of powerful regional kingdoms
Internal rebellions and weak successors
Inefficient administration & over-centralization
Invasions (e.g., Timur in 1398)
Final blow: Babur defeated Ibrahim Lodi in 1526

Important Terms to Remember

- **Iqta system:** Land grant in return for service
- **Amir:** Noble
- **Barid:** Spy
- **Muqti:** Administrator of Iqta
- **Chahalgani:** Group of 40 nobles under Iltutmish
- **Jaziya:** Tax on non-Muslims (re-imposed by Firoz Shah Tughlaq)

MUGHAL EMPIRE (1526–1857)

- **Founded by Babur in 1526** after defeating Ibrahim Lodi in the **First Battle of Panipat**.
- Mughals were of **Turko-Mongol origin**, descended from **Timur** and **Genghis Khan**.
- The empire lasted for **over 300 years (1526–1857)** and ruled most of the Indian subcontinent.
- Known for **centralized administration**, **religious tolerance (especially under Akbar)**, and grand architecture like the **Taj Mahal**.
- **The empire declined after Aurangzeb**, and ended with **Bahadur Shah Zafar** post the **1857 Revolt**.

Important Mughal Emperors (Chronological Order)

Ruler	Reign	Key Contributions
Babur	1526–1530	Founder of Mughal Empire, won First Battle of Panipat (1526)
Humayun	1530–1540, 1555–56	Defeated by Sher Shah Suri , regained throne briefly before death
Akbar	1556–1605	Greatest emperor; expanded empire, religious tolerance, Din-i-Ilahi
Jahangir	1605–1627	Patron of art; justice lover ; visited by Sir Thomas Roe
Shah Jahan	1628–1658	Built Taj Mahal , Red Fort, peak of Mughal architecture
Aurangzeb	1658–1707	Last powerful emperor; strict Islamic rule , longest reign

Ruler	Reign	Key Contributions
Later Mughals	1707–1857	Weak successors; empire declined; Bahadur Shah Zafar last Mughal emperor

Major Battles

Battle	Year	Significance
First Battle of Panipat	1526	Babur defeated Ibrahim Lodi
Battle of Khanwa	1527	Babur defeated Rajput confederacy under Rana Sanga
Battle of Ghagra	1529	Babur defeated Afghan forces
Battle of Chausa & Kannauj	1539–40	Sher Shah defeated Humayun
Second Battle of Panipat	1556	Akbar's regent Bairam Khan defeated Hemu

Mughal Administration

Feature	Details
Type	Centralized monarchy with bureaucracy
Land revenue system	Todar Mal's zabti system (based on crop yield and area)
Mansabdari system	Officers ranked in Zat (status) & Sawaar (cavalry)
Jagirdari system	Land grants to mansabdars for salary
Diwan-i-Wazarat	Finance minister
Diwan-i-Insha	Chief of royal correspondence
Diwan-i-Arz	Military affairs
Qazi-ul-Quzat	Chief judge

Religious Policy

Ruler	Policy
Akbar	Abolished Jaziya , began Sulh-i-Kul (peace with all), Din-i-Ilahi
Aurangzeb	Re-imposed Jaziya , orthodox Sunni Muslim

💡 Art, Architecture & Culture

Field	Examples / Contributions
Architecture	Taj Mahal, Red Fort (Delhi & Agra), Jama Masjid
Paintings	Flourished under Akbar, Jahangir (naturalistic style)

Field	Examples / Contributions
Language	Persian was court language; development of Urdu
Music	Tansen (navratna of Akbar), promoted classical Hindustani
Literature	Abul Fazl (Akbarname, Ain-i-Akbari), Badauni, Faizi

Navratnas of Akbar's Court

Name	Role
Abul Fazl	Historian (Akbarname)
Faizi	Poet
Tansen	Musician
Birbal	Advisor known for wit
Raja Todar Mal	Finance minister
Raja Man Singh	Military commander
(others include Abdul Rahim Khan-i-Khana, Fakir Aziao-Din, Mulla Do-Piyaza)	

Foreign Relations

Visitor	To Which Ruler	Purpose
Sir Thomas Roe	Jahangir	Diplomatic envoy of British king

Visitor	To Which Ruler	Purpose
William Hawkins	Jahangir	East India Company representative
Niccolo Manucci	Shah Jahan	Italian writer/observer
Jean-Baptiste Tavernier	Shah Jahan/Aurangzeb	French traveler

Decline of Mughal Empire

Reasons
Aurangzeb's religious intolerance alienated many groups
Over-extension of empire
Rise of regional kingdoms (Marathas, Sikhs, Rajputs)
Weak successors post-Aurangzeb
Invasions: Nadir Shah (1739) & Ahmad Shah Abdali (1757)
Rise of British East India Company
Ended in 1857 after Revolt; Bahadur Shah Zafar exiled

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BHAKTI & SUFI MOVEMENTS

Bhakti Movement

Overview

- Originated in **South India (7th–9th century)** with **Alvars (Vaishnavite)** and **Nayanars (Shaivite)** saints.
- Emphasized devotion (bhakti)** to a personal god over rituals and caste.
- Spread to **North India** by 12th–15th century.
- Opposed casteism, idol worship (in some cases), and orthodoxy.

Key Features

- Personal devotion** to a chosen deity (Vishnu, Shiva, Rama, Krishna, etc.)
- Use of vernacular languages** (e.g., Hindi, Marathi, Tamil)
- No need for priests** or rituals
- Emphasized equality**, love, compassion

Important Bhakti Saints

Saint	Region	Key Ideas
Ramananda	North India	Disciples from all castes (e.g., Kabir, Ravidas)
Kabir	Varanasi	Nirguna Bhakti (God is formless), rejected rituals
Guru Nanak	Punjab	Founded Sikhism, unity of God, no caste discrimination
Tulsidas	Uttar Pradesh	Wrote <i>Ramcharitmanas</i> in Awadhi
Mirabai	Rajasthan	Devotee of Krishna, spiritual poetry
Chaitanya Mahaprabhu	Bengal	Preacher of Krishna Bhakti
Namdev	Maharashtra	Emphasized love and devotion
Tukaram	Maharashtra	Devotional abhangas to Vithoba

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📌 Overview

- Mystical form of Islam that emphasized **love of God**, inner purity, and service.
- Originated in **Persia**, spread to India in **12th century**.
- Opposed rigid legalism, focused on **spiritual unity** with God.

💡 Key Features

- **Universal brotherhood** and tolerance
- Emphasized **inner purification** over outward rituals
- **Music (Sama) and poetry (Qawwali)** used for devotion
- Encouraged **interaction with Hindus**

🕌 Sufi Orders (Silsilas)

Order	Founder	Region	Features
Chishti	Khwaja Moinuddin Chishti	Ajmer	Love, tolerance, service to poor
Suhrawardi	Bahauddin Zakariya	Multan	More orthodox than Chishti

Order	Founder	Region	Features
Qadri	Abdul Qadir Jilani	Delhi & Punjab	Followed by Shah Waliullah
Naqshbandi	Bahauddin Naqshband	Delhi (later)	Conservative, no music

Comparison: Bhakti vs Sufi

Aspect	Bhakti Movement	Sufi Movement
Religion	Hinduism	Islam
God	Personal devotion (Saguna/Nirguna)	Union with Allah
Language	Vernacular (Hindi, Marathi, Tamil, etc.)	Persian, Urdu, local dialects
Medium	Songs, poetry	Qawwalis, Sama, poetry
Rituals	Rejected rituals and caste	Rejected orthodoxy and materialism
Popular Saints	Kabir, Mirabai, Tulsidas, Chaitanya	Nizamuddin Auliya, Moinuddin Chishti

MODERN HISTORY

ADVENT OF EUROPEANS

Background

- The **fall of Constantinople (1453)** to the Turks disrupted land trade routes between Europe and Asia.
- This led to **search for a sea route to India** for spices, silk, and other exotic goods.
- Resulted in the **Age of Exploration** and the arrival of various European powers in India.

European Powers in India (Chronological Order of Arrival)

European Power	Arrival in India	First Settlement / Factory
Portuguese	1498 (Vasco da Gama)	Calicut (Kerala) – 1498
Dutch	1605	Masulipatnam (Andhra Pradesh) – 1605
English (British)	1600 (EIC founded)	Surat (Gujarat) – 1613
French	1664	Surat (1668), Pondicherry – 1674
Danish	1616	Tranquebar (Tamil Nadu) – 1620

Portuguese (1498–1661)

- **Vasco da Gama** reached **Calicut** (1498), welcomed by **Zamorin**.
- First to establish **permanent settlements** in India.
- Built fort at **Cochin (1503)** and shifted HQ to **Goa (1510)**.
- Introduced **cartaz system** (naval passes).

- Known for **missionary activities** (St. Francis Xavier).
- Decline began after defeat by **Dutch and Marathas**.
- Portuguese retained **Goa** until **1961** (liberated by India).

Dutch (1605–1825)

- Established **Dutch East India Company (VOC)** in 1602.
- First settlement at **Masulipatnam (1605)**.
- Focused **mainly on spice trade in Indonesia**.
- **Lost to British in Battle of Bedara (1759)**.

British (1600–1947)

- **East India Company** formed in 1600 under Queen Elizabeth I.
- **First factory at Surat (1613)**, permission from **Jahangir**.
- Major settlements: **Madras (1639)**, **Bombay (1668)**, **Calcutta (1690)**.
- Became dominant after:
 - **Battle of Plassey (1757)**
 - **Battle of Buxar (1764)**
- Became rulers via **dual government** and then direct Crown rule (1858).

French (1664–1763)

- French East India Company formed in 1664 under **Colbert**.
- Important settlements: **Pondicherry, Chandernagore, Mahe, Karaikal**.
- Governor Dupleix** fought with British for supremacy.
- Lost in Carnatic Wars:**
 - First: 1746–48
 - Second: 1749–54
 - Third: 1758–63** → British victory
- Retained **French pockets** (Pondicherry, etc.) till **1954**.

Danish (1616–1845)

- Established factory at **Tranquebar** (**1620**) in Tamil Nadu.

- Also held **Serampore** in Bengal.
- Sold all settlements to British in **1845**.

Important Battles & Treaties

Event	Year	Outcome
Battle of Swally	1612	British defeated Portuguese (Naval power)
Battle of Plassey	1757	British defeated Siraj-ud-Daula (Bengal)
Battle of Buxar	1764	British gained Diwani rights
Treaty of Paris	1763	End of 3rd Carnatic War, British supremacy

ANGLO-FRENCH WARS IN INDIA (Carnatic Wars)

Background

- Took place mainly in the **Carnatic region** (South India).
- French **Governor Dupleix** vs **British Robert Clive**.

Three Carnatic Wars

War	Years	Result
First Carnatic War	1746–1748	French captured Madras; returned via Treaty of Aix-la-Chapelle
Second Carnatic War	1749–1754	British supported Mohammed Ali; defeated Chanda Sahib (French ally)

War	Years	Result
Third Carnatic War	1758–1763	Battle of Wandiwash (1760) → British defeated French decisively
		Ended by Treaty of Paris (1763) – French retained small trading posts

Battle of Wandiwash (1760) is the turning point: **British > French** forever in India.

ANGLO-MARATHA WARS

Background

- Fought between the **British East India Company** and the **Maratha Empire**.
- Resulted in British annexation of Maratha territories and political dominance.

✂ Three Anglo-Maratha Wars

War	Years	Cause	Result
First (1775–1782)	1775–1782	British supported Raghunath Rao's claim to Peshwa	Ended with Treaty of Salbai (1782) : Status quo maintained
Second (1803–1805)	1803–1805	Marathas refused Subsidiary Alliance	British victory ; Marathas lost Delhi, Orissa
Third (1817–1818)	1817–1818	Maratha uprising under Peshwa Baji Rao II	End of Maratha power ; British annexed all major Maratha territories

Third Anglo-Maratha War marks the **final collapse** of Maratha Confederacy.

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BRITISH POLICIES BEFORE 1857 REVOLT

These policies laid the foundation for **economic exploitation**, **political expansion**, and **social unrest**, leading to the **Revolt of 1857**.

1. Political Policies

◆ **Doctrine of Lapse**

- Introduced by **Lord Dalhousie**
- Allowed the British to annex Indian states where rulers died **without a natural heir**.
- Annexed States**: **Satara, Jhansi, Nagpur, Sambalpur**, etc.
- Sparked anger** among Indian rulers (notably Rani Laxmibai of Jhansi).

◆ **Subsidiary Alliance**

- Introduced by **Lord Wellesley**
- Indian rulers had to:

- Maintain British troops
- Accept a British Resident
- Not ally with other powers

- Hyderabad was the first to accept it (1798)**.

◆ **Annexations**

- States like **Awadh (1856)** were annexed on grounds of **"misgovernance"** under Dalhousie.
- Humiliation of Nawabs** created deep resentment.

2. Economic Policies

- **Deindustrialization**: British policies led to decline of Indian handicrafts and traditional industries.
- **Heavy land revenue** systems:
 - **Permanent Settlement** (Bengal) – Cornwallis
 - **Ryotwari System** – Munro (Madras, Bombay)
 - **Mahalwari System** – North India
- Peasants burdened with **high taxes**, land loss, and indebtedness.
- **Drain of Wealth** theory explained by **Dadabhai Naoroji**.

3. Social and Religious Interference

- **Abolition of Sati (1829)** by Lord William Bentinck
- **Legalization of widow remarriage (1856)** – seen as interference in religion
- Introduction of **Western education and English language** (Macaulay's Minute, 1835)
- Introduction of **Christian missionaries**
- Conversion fears caused **religious insecurity**

4. Military Policies

- **Discrimination** in pay, promotions, and treatment between British and Indian soldiers (sepoys)
- Use of **greased cartridges** (pork/beef fat) in **Enfield rifles** offended both **Hindus and Muslims**
- **Indian sepoys** were forced to serve **overseas** (against religious customs)

5. Infrastructure Policies

- Railways, telegraphs, and roads were introduced – but for British administrative and economic convenience.
- **Railways (1853: first line between Bombay and Thane)**

6. Legal and Administrative Changes

- Introduction of **British-style legal system**
- New laws like the **Charter Acts** (1813, 1833, 1853)
- **Indian Penal Code (IPC)** drafted in 1860 (post-1857), but groundwork laid before

Summary Table

Policy Type	Key Policies	Impact
Political	Doctrine of Lapse, Subsidiary Alliance	Annexations, anger among rulers
Economic	Land revenue systems, deindustrialization	Rural distress, economic drain
Social/Religious	Abolition of Sati, education reforms	Resentment, fear of religious erosion
Military	Discrimination, greased cartridges	Sepoy discontent, immediate trigger of 1857
Infrastructure	Railways, telegraph	Aided British control, not local development

Important Charter Acts

Charter Act	Year	Key Provisions
Charter Act	1793	- Renewed Company's rule for 20 years - Gave overriding powers to Governor-General - Continued trade monopoly
Charter Act	1813	- Ended Company's monopoly (except tea & China) - Allowed Christian missionaries ₹1 lakh/year for education
Charter Act	1833	- Ended Company's monopoly entirely - Created post of Governor-General of India - Set up Law Commission (Macaulay)
Charter Act	1853	- Introduced open competition for ICS - Separated legislative & executive functions - No renewal duration specified

MODERATES, EXTRMISTS & REVOLUTIONARIES

Moderates (1885–1905)

Approach: Constitutional, peaceful, gradual reforms

◆ Key Features:

- Believed in **British justice & goodwill**
- Used **petitions, speeches, debates, and resolutions**
- Demanded reforms, civil rights, Indianization of services
- Strong focus on **economic critique of British rule** (Drain of Wealth)

◆ Major Leaders:

- Dadabhai Naoroji** – *Drain Theory*, First Indian MP in British Parliament
- Gopal Krishna Gokhale** – Mentor to Gandhi

- Surendranath Banerjee** – Founder of Indian National Association
- Pherozeshah Mehta** – Bombay leader

◆ Achievements:

- Exposed British economic exploitation**
- Laid **foundation of nationalism**
- First demand for **Swaraj (1906)** by **Dadabhai Naoroji**

Extremists (1905–1918)

Approach: Assertive, direct action, national pride

◆ Key Features:

- Believed in **self-reliance, boycott, swadeshi, mass mobilization**

- Opposed the slow methods of Moderates
- Inspired by India's ancient glory and mass awakening

◆ **Major Leaders:**

- **Bal Gangadhar Tilak** – “Swaraj is my birthright...”
- **Lala Lajpat Rai, Bipin Chandra Pal** (Lal-Bal-Pal)
- **Aurobindo Ghosh**
- **B.C. Pal**
- V.O. Chidambaram Pillai

◆ **Important Events:**

- **Partition of Bengal (1905)** led to Swadeshi Movement
- **Surat Split (1907)** – Moderates vs Extremists
- Tilak's support to **Home Rule Movement (1916)**

3. Revolutionaries (1905–1930s)

Approach: Violent means to overthrow British rule

Key Features:

- Believed in **armed struggle**, secret societies
- Inspired by **international revolutions**
- Targeted **British officers, institutions, and traitors**

◆ **Key Activities:**

- **Alipore Bomb Case (1908)** – Aurobindo Ghosh's brother involved
- **Kakori Conspiracy (1925)** – Bhagat Singh, Ram Prasad Bismil
- **HSRA (1928)** – Bhagat Singh, Sukhdev, Rajguru killed Saunders
- **Chittagong Armoury Raid (1930)** – Led by Surya Sen

◆ **Prominent Revolutionaries:**

- Bhagat Singh
- Chandrashekhar Azad
- Ram Prasad Bismil
- Ashfaqulla Khan
- Surya Sen
- V.D. Savarkar (Abhinav Bharat)
- Anushilan Samiti (Bengal)

Aspect	Moderates	Extremists	Revolutionaries
Time Period	1885–1905	1905–1918	1905–1930s
Approach	Peaceful, constitutional	Assertive, mass agitation	Violent, secret societies
Belief	Faith in British justice	Self-rule, national pride	Overthrow British by force
Tactics	Petitions, resolutions	Swadeshi, boycott, protests	Assassinations, bombings
Leaders	Gokhale, Naoroji, Banerjee	Tilak, Lala Lajpat Rai	Bhagat Singh, Azad, Bismil
Outcome	Laid foundation	Mass nationalism	Instilled fear in British Raj

GANDHIAN PHASE (1915–1947)

Period of mass-based, non-violent movements led by Mahatma Gandhi

Gandhi's Arrival in India

- Year: 1915
- Returned from South Africa after leading Satyagraha
- Influenced by Gopal Krishna Gokhale
- Promoted truth, non-violence, swaraj, satyagraha, and swadeshi

Early Movements Before Non-Cooperation

Movement	Year	Place	Details
Champaran Satyagraha	1917	Bihar	Against indigo planters' exploitation (Tinkathia system)
Kheda Satyagraha	1918	Gujarat	Peasants' tax relief during famine
Ahmedabad Mill Strike	1918	Gujarat	Workers demanded better wages; Gandhi used hunger strike

Non-Cooperation Movement (1920–22)

- Trigger: **Jallianwala Bagh massacre (1919) + Khilafat issue**
- Objectives: Swaraj, Hindu-Muslim unity, boycott British institutions
- Tools: **Boycott of schools, colleges, courts, foreign goods**
- **Chauri Chaura incident (1922)**: Violence → Gandhi called off movement
- Result: Mass awakening, but failed to achieve swaraj

Civil Disobedience Movement (1930–34)

- Trigger: Salt Tax → Gandhi **launched Salt March** (Dandi March, 1930)
- Methods: **Breaking unjust laws**, salt making, no tax, forest laws defied
- Government Response: Harsh repression
- **Result: Gandhi-Irwin Pact (1931)** → Gandhi attended 2nd Round Table Conference
- Movement restarted after failure of talks

Quit India Movement (1942)

- Launch: **8th August 1942, Bombay**
- Slogan: **"Do or Die"**
- Reason: **Failure of Cripps Mission**, WWII exploitation
- Leaders arrested (Gandhi, Nehru, Patel) immediately
- **Movement became leaderless** but intense → youth-led uprisings
- Brutal British suppression; thousands jailed

Key Events & Outcomes of Gandhian Era

Year	Event	Significance
1915	Gandhi returns to India	Start of Gandhian phase
1919	Jallianwala Bagh massacre	Spark for mass movements
1920–22	Non-Cooperation Movement	First all-India mass movement
1930	Dandi March	Start of Civil Disobedience Movement
1942	Quit India Movement	Final mass uprising against British rule
1947	Independence	End of Gandhian phase

CONSTITUTIONAL DEVELOPMENTS (1909–1947)

This period marked the gradual transfer of power from the British to Indians through a series of Acts, Reports, and Plans, laying the foundation of India's Constitution.

1. Indian Councils Act, 1909 (Morley-Minto Reforms)

- Increased Indian participation in legislative councils
- Introduced **Separate Electorates for Muslims (first time)**
- Indians could now discuss budgets & ask questions
- Limited representation, no real power to Indians

2. Government of India Act, 1919 (Montagu-Chelmsford Reforms)

- Introduced Dyarchy in provinces:
 - **Reserved subjects (British control):** police, finance
 - **Transferred subjects (Indian ministers):** education, health
- Expanded legislative councils with more Indians
- Introduced bicameral legislature at the Centre
- **Separate electorates extended to Sikhs, Christians, Anglo-Indians**
- Led to frustration → Non-Cooperation Movement (1920)

3. Simon Commission (1927)

- All members were British, no Indian representation

- **Faced nationwide boycott ("Simon Go Back")**

- Resulted in Nehru Report (1928) – Draft Constitution by Indians

4. Communal Award (1932)

- By Ramsay MacDonald
- **Provided separate electorates for Depressed Classes (SCs)**
- **Opposed by Gandhi → Poona Pact with B.R. Ambedkar**
- **Reserved seats for Dalits, but within general electorate**

5. Government of India Act, 1935

Most comprehensive act before Independence

- Abolished dyarchy at provinces; introduced it at the Centre
- Provided for provincial autonomy
- Introduced All India Federation (never implemented)
- **Established Federal Court**
- Provided for elections (1937) – Congress won 8 provinces
- Basis for the future Constitution of India

6. August Offer (1940)

- Promised **Dominion Status** after WWII
- Rejected by Congress; led to Individual Satyagraha

7. Cripps Mission (1942)

- Proposed Constituent Assembly after the war
- Promised Dominion Status
- Congress rejected it → launched Quit India Movement

- Constituent Assembly to frame the Constitution

8. Cabinet Mission Plan (1946)

- Proposed formation of Constituent Assembly
- Grouping of provinces into three sections
- Plan accepted by Congress and League initially
- Muslim League later demanded Pakistan

9. Mountbatten Plan (1947)

- Proposed partition of India
- Accepted by Congress, Muslim League, and Sikh leaders
- Led to the Indian Independence Act, 1947

10. Indian Independence Act, 1947

- Passed by British Parliament
- India to be partitioned into India and Pakistan
- End of British rule on 15 August 1947
- Dominion status for both

Quick Revision Table

Act/Plan	Year	Key Features
Indian Councils Act	1909	Separate electorate for Muslims
Govt. of India Act	1919	Dyarchy in provinces, bicameralism
Govt. of India Act	1935	Provincial autonomy, federal court, basis of Constitution
Simon Commission	1927	Boycotted, no Indians
Communal Award	1932	Separate electorates to SCs → Poona Pact
Cripps Mission	1942	Proposed Constituent Assembly – rejected
Cabinet Mission	1946	Constituent Assembly approved
Mountbatten Plan	1947	Partition of India
Indian Independence Act	1947	End of British rule, Dominion status

GOVERNOR-GENERALS & VICEROYS OF INDIA

✓ Governor-General of Bengal (1773–1833)

Name	Key Contributions
Warren Hastings (1773–1785)	◆ First Governor-General of Bengal ◆ Pitt's India Act (1784) ◆ Rohilla War ◆ Regulated civil administration ◆ Impeachment trial in Britain
Lord Cornwallis (1786–1793)	◆ Introduced Permanent Settlement (1793) ◆ Reformed police and civil services ◆ 3rd Anglo-Mysore War
Lord Wellesley (1798–1805)	◆ Introduced Subsidiary Alliance ◆ 4th Anglo-Mysore War ◆ 2nd Anglo-Maratha War
Lord Hastings (1813–1823)	◆ Ended Company's trade monopoly (1813 Act) ◆ Anglo-Nepal War ◆ 3rd Anglo-Maratha War (end of Maratha power)

Governor-General of India (1833–1858)

Title changed under Charter Act of 1833

Name	Key Contributions
Lord William Bentinck (1828–1835)	◆ First Governor-General of India ◆ Abolition of Sati (1829) ◆ Suppression of Thuggee ◆ English education (Macaulay's Minute 1835)
Lord Dalhousie (1848–1856)	◆ Doctrine of Lapse ◆ Railway (1853), Telegraph, Postal reforms ◆ 2nd Anglo-Sikh War ◆ Public Works Department ◆ Widow Remarriage Act (1856)

Viceroy of India (1858–1947)

Title started after the Government of India Act 1858

Viceroy	Key Events
Lord Canning (1856–1862)	◆ First Viceroy of India ◆ Revolt of 1857 ◆ Indian Councils Act (1861) ◆ Universities in Calcutta, Bombay, Madras (1857)
Lord Lytton (1876–1880)	◆ Vernacular Press Act (1878) ◆ Arms Act (1878) ◆ 2nd Afghan War ◆ Delhi Durbar (1877)
Lord Ripon (1880–1884)	◆ Father of Local Self-Government ◆ Ilbert Bill controversy ◆ Repealed Vernacular Press Act
Lord Curzon (1899–1905)	◆ Partition of Bengal (1905) ◆ Establishment of Archaeological Survey of India
Lord Minto II (1905–1910)	◆ Morley-Minto Reforms (1909) ◆ Separate electorates for Muslims
Lord Hardinge (1910–1916)	◆ Capital shifted to Delhi (1911) ◆ Delhi Durbar (1911)
Lord Chelmsford (1916–1921)	◆ Montagu-Chelmsford Reforms (1919) ◆ Rowlatt Act ◆ Jallianwala Bagh Massacre (1919) ◆ Non-Cooperation Movement launched
Lord Irwin (1926–1931)	◆ Simon Commission (1928) ◆ Civil Disobedience Movement (1930) ◆ Gandhi-Irwin Pact (1931)
Lord Willingdon (1931–1936)	◆ 2nd & 3rd Round Table Conferences ◆ Communal Award (1932) ◆ Poona Pact
Lord Linlithgow (1936–1943)	◆ Longest-serving Viceroy ◆ Government of India Act (1935) implemented ◆ Cripps Mission (1942) ◆ Quit India Movement (1942)

Viceroy	Key Events
Lord Wavell (1943–1947)	◆ Wavell Plan (1945) ◆ Simla Conference
Lord Mountbatten (1947)	◆ Last British Viceroy ◆ Mountbatten Plan ◆ Partition & Indian Independence Act (1947)

SOCIO-RELIGIOUS REFORM MOVEMENTS

These movements aimed to reform society, remove social evils, promote education, and revive Indian culture, often reacting to colonial rule and Christian missionary activities.

1. Brahmo Samaj (1828)

- Founder: Raja Ram Mohan Roy
- Beliefs: Monotheism, opposed idol worship, caste, and sati
- Key Reforms:
 - Abolition of Sati (1829)
 - Support for widow remarriage & women's education
- Later Leaders: Keshab Chandra Sen, Debendranath Tagore

2. Arya Samaj (1875)

- Founder: Swami Dayanand Saraswati
- Beliefs:
 - Vedas are infallible
 - Against caste by birth, child marriage, idol worship
- Slogan: "Go back to the Vedas"
- Reforms:
 - Shuddhi Movement (reconversion to Hinduism)

- Women's upliftment, education promotion

3. Ramakrishna Mission (1897)

- Founder: Swami Vivekananda
- Inspired by: Ramakrishna Paramhansa
- Beliefs:
 - Service to humanity is service to God
 - Harmony of religions
- Work: Education, health, disaster relief
- Motto: "Atmano mokshartham jagat hitaya cha"

4. Prarthana Samaj (1867)

- Location: Maharashtra
- Inspired by: Brahmo Samaj
- Key Leaders: Atmaram Pandurang, M.G. Ranade
- Beliefs: Monotheism, social reform, women's rights, widow remarriage

5. Aligarh Movement

- Leader: Sir Syed Ahmed Khan
- Goal: Modern education for Muslims
- Founded: MAO College (1875) – later became Aligarh Muslim University
- Advocated Western education, social reforms within Islam

6. Wahabi Movement

- Inspired by: Abdul Wahab (Arabia), led in India by Syed Ahmad Barelvi
- Belief: Purify Islam from western & Hindu influences

7. Theosophical Society (1875 in USA, 1879 in India)

- Founders in India: Annie Besant, Madame Blavatsky
- Promoted Hindu philosophy, universal brotherhood
- Annie Besant later involved in Home Rule Movement

8. Young Bengal Movement

- Leader: Henry Louis Vivian Derozio
- Encouraged freedom of thought, women's education, rationalism
- Active in Calcutta, supported by Western-educated youth

9. Devendranath Tagore & Tattvabodhini Sabha

- Revived Brahmo Samaj ideas
- Promoted rational Vedic Hinduism

Quick Comparison Table

Movement	Founder	Focus Areas
Brahmo Samaj	Raja Ram Mohan Roy	Sati abolition, monotheism, women's rights
Arya Samaj	Swami Dayanand Saraswati	Vedic revival, social reform, Shuddhi
Ramakrishna Mission	Swami Vivekananda	Religious harmony, service, spiritual education
Prarthana Samaj	Atmaram Pandurang	Reform Hinduism, women's rights, education
Aligarh Movement	Sir Syed Ahmed Khan	Muslim modern education, social reform
Wahabi Movement	Syed Ahmad Barelvi	Islamic revivalism, anti-British
Theosophical Society	Annie Besant	Ancient wisdom, universal brotherhood
Young Bengal	H.L.V. Derozio	Rationalism, free thought

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ECONOMY

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1. ECONOMIC TERMS

MICRO ECONOMIC TERMS

1. Demand

- The quantity of a good that a consumer is **willing and able to buy** at a given price in a given time.

- Law of Demand:** Price $\uparrow \rightarrow$ Demand $\downarrow$ (*inverse relationship*)

Related Terms:

- Demand Curve:** Downward sloping
- Individual Demand vs Market Demand:** One person vs all buyers
- Elasticity of Demand:** Sensitivity of demand to price/income change

2. Supply

- The quantity of a good that producers are **willing to offer** at different prices.

- Law of Supply:** Price $\uparrow \rightarrow$ Supply $\uparrow$ (*direct relationship*)

Related:

- Elasticity of Supply:** Measures how much supply changes with price
- Supply Curve:** Upward sloping

3. Utility

- Satisfaction derived from consuming a good or service.

Types:

- Total Utility (TU):** Total satisfaction from all units
- Marginal Utility (MU):** Additional satisfaction from one more unit

Law of Diminishing Marginal Utility: MU decreases as consumption increases.

4. Consumer Equilibrium

- When a consumer maximizes satisfaction within their **budget constraint**.

5. Indifference Curve

- A curve showing combinations of two goods giving **equal satisfaction** to the consumer.
- Downward sloping and convex** to the origin.

6. Budget Line

- Shows all possible combinations of two goods that a consumer can afford.

7. Production

- The process of converting **inputs** into **outputs**.

Inputs (Factors of Production):

- Land** – natural resources
- Labor** – human effort
- Capital** – machinery, tools
- Entrepreneur** – risk bearer

8. Cost

- Explicit Cost:** Out-of-pocket costs (wages, rent)
- Implicit Cost:** Opportunity cost of using owned resources
- Total Cost = Fixed Cost + Variable Cost**

9. Revenue

- Total Revenue (TR) = Price $\times$ Quantity sold**
- Average Revenue (AR) = TR / Quantity**

- **Marginal Revenue (MR)** = Change in TR from selling one more unit

10. Market Structures

Structure	Features	Example
Perfect Competition	Many sellers, identical goods, price takers	Wheat, rice
Monopoly	Single seller, no close substitutes, price maker	Indian Railways
Oligopoly	Few dominant sellers, interdependent pricing	Telecom, airlines
Monopolistic Competition	Many sellers, differentiated products, free entry	Toothpaste, clothing

11. Price Mechanism

- The system where **demand and supply** determine the price and quantity in the market.

12. Equilibrium Price

- The price at which **demand = supply**
- Market clears: no surplus, no shortage

MACRO ECONOMIC TERMS

1. Gross Domestic Product (GDP)

- Total value of **final goods and services** produced **within the geographical boundaries** of a country in one year.
- Reflects the **overall economic performance**.
- Types:
 - **Nominal GDP**: Current prices (includes inflation)
 - **Real GDP**: Adjusted for inflation (better for comparison over time)

2. Gross National Product (GNP)

- **GNP = GDP + Net Factor Income from Abroad**
- Considers the **income earned by nationals** abroad minus income earned by foreigners in the country.
- Focuses on **citizenship**, not geography.

3. Net National Product (NNP)

- **NNP = GNP – Depreciation**
- Also known as **National Income at Factor Cost**
- Measures the actual income available after accounting for **wear and tear** of capital assets.

4. Per Capita Income

- **Per Capita Income = National Income / Population**
- Reflects **average income per person**.
- Often used to compare **living standards** across nations.

5. Inflation

- A **sustained increase** in the general price level of goods and services.
 - Reduces the **purchasing power** of money.
 - Measured by:
 - **CPI** (Consumer Price Index – retail level)
 - **WPI** (Wholesale Price Index)
-

6. Deflation

- Persistent **decrease** in the general price level.
 - Leads to **lower consumer demand**, reduced investment, and rising unemployment.
-

7. Stagflation

- Combination of **high inflation + high unemployment + slow economic growth**.
 - Very difficult to control with traditional economic tools.
-

8. Recession

- A **significant decline in economic activity** across the economy for a sustained period (usually 2 consecutive quarters).
 - Characterized by:
 - Negative GDP growth
 - Reduced investment
 - High unemployment
-

9. Monetary Policy

- Managed by the **Reserve Bank of India (RBI)**.
 - Controls **money supply and interest rates** to ensure economic stability.
 - Tools:
 - **Repo Rate**: Rate at which RBI lends to banks
 - **CRR (Cash Reserve Ratio)**: % of deposits kept with RBI
 - **SLR (Statutory Liquidity Ratio)**: % of deposits invested in govt. securities
 - **OMO (Open Market Operations)**: Buying/selling govt. securities
-

10. Fiscal Policy

- Managed by the **Government of India** (Ministry of Finance).
 - Uses **taxation and government spending** to influence the economy.
 - Types:
 - **Expansionary**: Increased spending or tax cuts to boost demand
 - **Contractionary**: Decreased spending or tax hikes to control inflation
-

11. Fiscal Deficit

- **Fiscal Deficit = Total Expenditure – Total Revenue (excluding borrowings)**
 - Indicates how much the government needs to **borrow** to meet expenses.
-

12. Primary Deficit

- **Primary Deficit = Fiscal Deficit – Interest Payments**
- Shows **how much new borrowing** is used for purposes other than interest payments.

13. Balance of Payments (BoP)

- Record of **all economic transactions** between India and the rest of the world.
- Components:
 - **Current Account:** Trade in goods/services, remittances
 - **Capital Account:** Investments, loans, FDI/FII

14. Foreign Exchange Reserves

- **Assets held by the RBI** in foreign currencies.
- Includes: **Foreign currencies, gold, SDRs (Special Drawing Rights), IMF reserves.**
- Used to **stabilize rupee** and manage **external shocks.**

16. Poverty

- Inability to **meet basic needs** like food, clothing, and shelter.
- Measured using **Poverty Line** based on consumption/income.

15. Unemployment

- Condition where **willing and able people** cannot find suitable jobs.
- Types:

- **Structural:** Due to mismatch of skills
- **Cyclical:** Due to economic slowdown
- **Seasonal:** Agriculture-based jobs
- **Frictional:** Temporary gap between jobs
- **Agriculture (Disguised)**

17. Human Development Index (HDI)

- Published by **UNDP**
- Measures **development based on:**
 - Life expectancy
 - Education (mean and expected years)
 - Per capita income

2. MONEY & BANKING

1. Reserve Bank of India (RBI)

Feature	Details
Established	1935, under RBI Act, 1934
Nationalised	1949
Headquarters	Mumbai
Current Governor (as of 2025)	Sanjay Malhotra
Role	Central Bank, regulator of banks & currency

2. Functions of RBI

- **Monetary Authority** – Controls inflation, growth
- **Currency Issuer** – Issues all currency except ₹1 (by Govt of India)
- **Custodian of Foreign Exchange Reserves**
- **Banker to Government**
- **Bankers' Bank** – Regulates commercial banks

3. Monetary Policy Tools (Instruments) - QUANTITATIVE

Instrument	What It Does
Repo Rate	Rate at which RBI lends to banks
Reverse Repo Rate	Rate at which RBI borrows from banks
CRR (Cash Reserve Ratio)	% of deposits banks must keep with RBI
SLR (Statutory Liquidity Ratio)	% of deposits to be keep with banks themselves
Bank Rate	Long-term borrowing rate from RBI
Open Market Operations (OMO)	Buying/selling govt securities to regulate liquidity

What Are Quantitative Tools?

Quantitative tools (also called **general instruments**) aim to **control the total volume of credit** and **money supply** in the economy. They do **not target specific sectors** but affect **overall liquidity and interest rates**.

1. Repo Rate (Repurchase Rate)

- **Meaning:** The rate at which RBI lends short-term funds to commercial banks against government securities.
- **Effect:**
 - **↓ Repo Rate:** Cheaper loans → More borrowing by banks → More lending to public → Increased liquidity
 - **↑ Repo Rate:** Costly loans → Reduced borrowing → Reduced money supply → Inflation control
- **Example:** If inflation is high, RBI may increase repo rate to control excess demand.
- **Current Repo Rate:** [Ask me for the latest, or I can update with real-time info.]

2. Reverse Repo Rate

- **Meaning:** The rate at which RBI borrows money from banks.
- **Effect:**
 - **↑ Reverse Repo:** Banks prefer parking funds with RBI → Less money with public → Controls inflation

- **↓ Reverse Repo:** Encourages banks to lend more → Boosts growth

- Used alongside repo rate to manage short-term liquidity.

3. CRR (Cash Reserve Ratio)

- **Meaning:** The % of a bank's net demand and time liabilities (NDTL) that must be kept in cash with RBI.
- **No interest is paid** on CRR balances.
- **Effect:**
 - **↑ CRR:** Less money to lend → Tightens liquidity → Controls inflation
 - **↓ CRR:** More money to lend → Boosts liquidity → Stimulates growth
- **Powerful tool** for quick liquidity adjustment.

4. SLR (Statutory Liquidity Ratio)

- **Meaning:** The % of a bank's NDTL that must be kept in liquid assets like:
 - **Gold**
 - **Approved securities (mainly govt. bonds)**
 - **Cash**
- **Effect:**
 - **↑ SLR:** Less money available for loans → Contraction in credit
 - **↓ SLR:** More funds available for lending → Expansion in credit
- **Used to regulate bank leverage** and to ensure solvency.

5. Bank Rate

Meaning: The rate at which RBI provides **long-term loans** to banks (without repurchase agreement).

- **Effect:**
 - **↑ Bank Rate:** Signals tightening → Expensive loans → Less money supply
 - **↓ Bank Rate:** Cheaper borrowing → Boosts liquidity
 - Used rarely now due to preference for repo mechanism.
-

6. Open Market Operations (OMO)

- **Meaning:** **Buying or selling** of **government securities** by RBI in the open market.
 - **Effect:**
 - **RBI buys securities** → Infuses money into the system → Liquidity ↑
 - **RBI sells securities** → Absorbs money from the system → Liquidity ↓
 - A major tool to manage **day-to-day liquidity** and influence **interest rates**.
-

Summary Comparison Table

Tool	Expansionary Policy	Contractionary Policy
Repo Rate	Decrease → Cheaper loans	Increase → Costlier loans
Reverse Repo	Decrease → Less RBI borrowing	Increase → Absorb excess funds
CRR	Decrease → More money to lend	Increase → Less money to lend
SLR	Decrease → Boost lending capacity	Increase → Reduce lending
Bank Rate	Decrease → Encourages credit	Increase → Tightens credit
OMO	Buy securities → Infuse liquidity	Sell securities → Suck out liquidity

Qualitative Tools (Regulate credit to specific sectors)

Instrument	Explanation
Margin Requirement	Difference between loan value and asset value. Higher margin = Less borrowing
Moral Suasion	RBI persuades banks to follow desirable credit policy through meetings/statements
Credit Rationing	RBI sets lending limits for banks in select sectors
Selective Credit Controls	Direct restrictions on loans for specific purposes (e.g. speculative activities)

Types of Monetary Policy

Type	Purpose	When Used?
Expansionary Policy	Increase money supply to stimulate demand	During recession or low growth
Contractionary Policy	Decrease money supply to reduce inflation	During high inflation

Summary Chart

Tool	Expansionary	Contractionary
Repo Rate	↓	↑
CRR/SLR	↓	↑
OMO	RBI buys	RBI sells
Moral Suasion	Easy credit	Tight credit

RBI's Monetary Policy Actions: Inflation vs Deflation

Instrument	During Inflation (To reduce money supply)	During Deflation (To increase money supply)
Repo Rate	▲ Increase – makes borrowing costlier	▼ Decrease – makes borrowing cheaper
Reverse Repo Rate	▲ Increase – attracts banks to park funds	▼ Decrease – discourages banks from parking funds
CRR (Cash Reserve Ratio)	▲ Increase – reduces lending capacity	▼ Decrease – increases funds for lending
SLR (Statutory Liquidity Ratio)	▲ Increase – limits available credit	▼ Decrease – frees up funds for lending

3.INFLATION

Rise in prices of goods and services over time, which reduces the value of money.

Types of Inflation:

- **Demand-pull:** Too much demand, not enough supply
- **Cost-push:** Increase in production cost (e.g., fuel, wages)
- **Core inflation:** Excludes food & fuel
- **Headline inflation:** Includes all items
- **Deflation:** Prices fall continuously
- **Disinflation:** Inflation rate is falling but still positive

Price Indices in India

CPI – Consumer Price Index (Retail level)

- Measures prices paid by consumers
- Published by **NSO (MoSPI)**
- Used by **RBI** for inflation targeting
- **Base year: 2012**

WPI – Wholesale Price Index (Wholesale level)

- Measures prices at wholesale (bulk) level
- It **does not include Services**
- Published by **Office of Economic Adviser (DPIIT)**
- **Not used** by RBI for policy decisions
- **Base year: 2011–12**

Other Terms

- **GDP Deflator:** Inflation based on GDP
- **Core Inflation:** Excludes volatile items (food, fuel)
- **RBI's Inflation Target**
- Target: **4% (±2%) based on CPI**
- Acceptable range: **2% to 6%**

CPI vs WPI – Comparison Table

Feature	CPI (Consumer Price Index)	WPI (Wholesale Price Index)
📌 Meaning	Measures prices at retail level	Measures prices at wholesale level
👤 Who it affects	End consumers	Producers or wholesale traders
🏛️ Published by	NSO (under MoSPI)	Office of Economic Adviser (DPIIT)
🎯 Purpose	Tracks cost of living	Tracks production cost trends
💰 RBI uses it?	✅ Yes, for monetary policy	❌ No
📅 Base Year	2012 = 100	2011–12 = 100
📦 Items Covered	Food, rent, clothing, transport, etc.	Fuel, metals, raw materials, etc.
🌐 Inflation Type	Also called retail inflation	Known as wholesale inflation

4.BUDGET & FISCAL POLICY

What is a Budget?

- **Annual Financial Statement** as per **Article 112** of the Indian Constitution.
- Presented by the **Finance Minister** in **Lok Sabha**, usually on **1st February** each year.
- Shows:
 - Estimated **receipts and expenditures** of the government for the upcoming financial year.
 - Covers **1 April to 31 March**.

Components of the Union Budget

1. Revenue Budget

- Deals with **regular income and expenses**
- **Revenue Receipts:** Tax and Non-tax income
- **Revenue Expenditure:** Day-to-day expenses (salaries, subsidies)

2. Capital Budget

- Deals with **investment and borrowing**
- **Capital Receipts:** Borrowings, disinvestment
- **Capital Expenditure:** Loans to states, infrastructure, asset creation

Types of Receipts

Category	Examples
Revenue Receipts	Income Tax, GST, Interest, Dividends from PSUs
Capital Receipts	Borrowings (internal & external), Disinvestment, Loan recovery

Types of Expenditures

Category	Examples
Revenue Expenditure	Subsidies, salaries, pensions, interest payments
Capital Expenditure	Highways, railways, education infra, defence capital, loans to states

Key Budget Deficit Terms

Term	Formula
Fiscal Deficit	Total Expenditure – (Revenue Receipts + Non-Debt Capital Receipts)
Revenue Deficit	Revenue Expenditure – Revenue Receipts
Primary Deficit	Fiscal Deficit – Interest Payments
Effective Revenue Deficit	Revenue Deficit – Grants given to states for capital creation

What is Fiscal Policy?

- Use of **government spending and taxation** to influence the economy.
- Managed by the **Ministry of Finance**, Government of India.
- Objective: **Stabilize economy**, manage **inflation**, boost **growth** and **employment**

Types of Fiscal Policy

Policy	When Used	Purpose
Expansionary	During slowdown/deflation	Increase govt. spending or cut taxes
Contractionary	During inflation	Cut spending or raise taxes to reduce demand

Tools of Fiscal Policy

Tool	How It Works
Taxation	Direct (Income Tax), Indirect (GST) – adjusted to manage demand
Government Spending	Spending on welfare, infrastructure, jobs – boosts demand
Subsidies	For food, fuel, fertilizers – helps poor sections and controls inflation
Public Borrowing	Loans from market to finance deficit
Disinvestment	Selling PSU shares to raise funds

FRBM Act (Fiscal Responsibility and Budget Management)

- Passed in 2003 to ensure **fiscal discipline**
- Aims to reduce:
 - **Fiscal Deficit to 3% of GDP**
 - **Revenue Deficit to 0%** over time
- Promotes **transparency and long-term growth**

Difference Between Fiscal and Monetary Policy

Fiscal Policy	Monetary Policy
Managed by Finance Ministry	Managed by RBI
Involves taxes and spending	Involves money supply and interest rates
Used to affect demand directly	Used to affect liquidity and credit

Types of Taxes in India

Category	Type	Examples
Direct Tax	Paid directly by individuals/entities to govt.	Income Tax, Corporate Tax, Capital Gains
Indirect Tax	Paid indirectly by consumers via goods/services	GST, Excise (on petroleum/alcohol), Customs

4. Securities Transaction Tax (STT)

Direct Taxes – Key Points

1. Income Tax

- Paid by individuals and HUFs (Hindu Undivided Families)
- Based on slabs (5%, 10%, 15%, etc.)

2. Corporate Tax

- Paid by companies on profits
- 22% (normal companies), 15% (new manufacturing firms)

3. Capital Gains Tax

- Tax on profits from sale of assets (e.g. land, shares)

- On trading of securities on stock exchanges

Indirect Taxes – Before GST

Before 2017, multiple taxes were levied by Centre and States:

▼ Central Taxes:

- Excise Duty
- Service Tax
- Customs Duty

▼ State Taxes:

- VAT (Value Added Tax)
- Entry Tax
- Entertainment Tax
- Octroi, Purchase Tax

5. GOODS AND SERVICES TAX

What is GST?

A single, unified **indirect tax** on the **supply of goods and services**, introduced on **1st July 2017** through the **101st Constitutional Amendment Act**.

Motto: “**One Nation, One Tax, One Market**”

Types of GST

Type	Levied By	When Applicable
CGST	Central Govt	On intra-state supply (within same state)
SGST	State Govt	On intra-state supply
UTGST	Union Territory Govt	On intra-UT supply
IGST	Central Govt	On inter-state supply and imports/exports

GST Council

- Created under **Article 279A**
- Recommends rates, exemptions, and policies
- Members:
 - Union Finance Minister (Chairperson)
 - Union MoS for Finance
 - Finance Ministers of all States/UTs

- Widened the **tax base**

Exclusions from GST

Item	Taxed Under
Alcohol for human consumption	State Excise
Petroleum products	Central Excise + VAT (for now)
Electricity	Not under GST
Real estate (under construction)	Partially under GST

Benefits of GST

- Replaces multiple indirect taxes with a **single unified tax**
- Reduces tax cascading** (tax on tax)
- Increases **compliance and transparency**
- Promotes **ease of doing business**

Important Constitutional Articles Related to GST

Article	Provision
Art. 246A	Power to make GST laws
Art. 269A	Levy and distribution of IGST
Art. 279A	GST Council

6.ECONOMIC PLANNING & NITI AAYOG

Economic planning refers to **resource allocation by the government** based on **national priorities and long-term development goals**.

Types of Planning

Type	Meaning
Indicative Planning	Govt sets broad targets, private sector free to decide (used now)
Directive Planning	Govt controls production, investment, prices (used earlier)

History of Planning in India

Year	Event
1934	M. Visvesvaraya proposed planned economy in his book " <i>Planned Economy for India</i> "
1944	Bombay Plan by Indian industrialists
1950	Planning Commission established by executive resolution
1951	First Five-Year Plan launched

Planning Commission (1950–2014)

- Non-constitutional, non-statutory body.
- Headed by **Prime Minister**.
- Responsible for:
 - Drafting 5-Year Plans
 - Allocating central funds to states
 - Promoting balanced development

Five-Year Plans of India (Highlights)

Plan	Period	Focus
1st Plan	1951–56	Agriculture, irrigation (Nehru–Harrod-Domar model)
2nd Plan	1956–61	Industrialisation (Mahalanobis Model)
5th Plan	1974–79	Poverty removal (Garibi Hatao)
6th Plan	1980–85	Growth with technology
10th Plan	2002–07	Faster sustainable growth
12th Plan	2012–17	Inclusive and sustainable growth

NITI Aayog – New Era of Planning

National Institution for Transforming India (NITI Aayog) is a **policy think tank** of the Government of India, established on **1 January 2015**, replacing the Planning Commission.

NITI Aayog – Key Features

Feature	Details
Formed on	1st January 2015
By	Executive resolution (non-constitutional, non-statutory)
Chairperson	Prime Minister
Vice-Chairperson	Appointed by PM (currently: [Ask for latest])
CEO	Appointed by Government

Structure of NITI Aayog

- **Governing Council:** PM + Chief Ministers + Lt. Governors of UTs
- **Regional Councils:** Formed for addressing regional issues
- **Special Invitees:** Union Ministers
- **Full-time Members:** Experts from academia and industry

✓ 4. Functions of NITI Aayog

Function	Explanation
Policy Formulation	Think tank role for short- and long-term policy
Cooperative Federalism	Involves states in national planning
Monitoring & Evaluation	Monitors implementation of government schemes
Innovation & Research	Promotes start-ups, digital economy, and AI strategy
Sustainable Development Goals	Aligns national plans with SDG targets

Differences: Planning Commission vs NITI Aayog

Feature	Planning Commission	NITI Aayog
Established	1950	2015
Model	Top-down (centralized)	Bottom-up (decentralized)
Resource Allocation	Yes	No

Feature	Planning Commission	NITI Aayog
Five-Year Plans	Yes	No
Policy Think Tank	No	Yes
Federalism	Weak cooperation	Promotes cooperative federalism

Key Initiatives by NITI Aayog

- Aspirational Districts Programme
- Atal Innovation Mission (AIM)
- Health Index, School Education Quality Index
- Digital India & AI Strategy
- SDG India Index

7. POVERTY, UNEMPLOYMENT, INEQUALITY

POVERTY

A condition where a person **lacks sufficient income** to meet **basic necessities** like food, shelter, clothing, healthcare, and education.

Types of Poverty

Type	Meaning
Absolute Poverty	Inability to meet minimum basic needs
Relative Poverty	Economic inequality compared to others in society

Type	Meaning
Urban Poverty	Poor living standards in urban areas
Rural Poverty	Low agricultural income, underemployment, and poor facilities

Poverty Line in India

- Defined based on **minimum calorie intake and expenditure.**
- Tendulkar Committee (2009):**
 - ₹33/day (urban) and ₹27/day (rural) at 2011–12 prices.
- Rangarajan Committee (2014):**
 - ₹47/day (urban) and ₹32/day (rural).

Causes of Poverty

- Population explosion
- Unemployment & underemployment
- Unequal land distribution
- Inflation and price rise
- Lack of access to education and skills
- Social exclusion (e.g., caste system)

Major Poverty Alleviation Programs

Scheme	Objective
MGNREGA (2005)	100 days of wage employment in rural areas
PMAY – Gramin/Urban	Housing for all

Scheme	Objective
NSAP (National Social Assistance Program)	Old-age pension, widow pension etc.
National Food Security Act (2013)	Subsidized food grain for ~67% of population
Deen Dayal Antyodaya Yojana	Livelihood & skill development for poor

Unemployment in India

What is Unemployment?

A situation where people **willing and able to work** at existing wages **cannot find jobs.**

Types of Unemployment in India

Type	Meaning
Disguised Unemployment	More people than required working (common in agriculture)
Seasonal Unemployment	Jobs available only during specific seasons (e.g., agriculture)
Structural Unemployment	Due to lack of skills or technological mismatch
Cyclical Unemployment	Due to economic downturn or recession
Frictional Unemployment	Temporary – during job switching or relocation
Educated Unemployment	Qualified youth remain jobless due to lack of opportunities

Causes of Unemployment

- Population pressure
- Slow industrial and infrastructure growth
- Skill-job mismatch
- Outdated education system
- Lack of entrepreneurship and innovation

Employment Generation Schemes

Scheme	Objective
MGNREGA	Rural employment through manual work
PM Kaushal Vikas Yojana (PMKVY)	Skill development
Startup India / Stand-Up India	Promote entrepreneurship
National Career Service (NCS)	Job portal and employment services

Economic Inequality

✓ What is Economic Inequality?

Uneven distribution of income or wealth among individuals or groups in a society.

✓ Types of Inequality

Type	Explanation
Income Inequality	Differences in earnings across individuals
Wealth Inequality	Unequal ownership of assets like land, property, shares

Type	Explanation
Regional Inequality	Some states more developed than others (e.g., Kerala vs Bihar)

✓ Causes of Inequality

- Unequal access to education and healthcare
- Caste and gender discrimination
- Inherited wealth concentration
- Urban-rural divide
- Policy failures and corruption

✓ Important Indices

Index	Published By	Measures
Gini Coefficient	UNDP, World Bank	Measures income inequality (0 = perfect equality, 1 = worst)
Human Development Index	UNDP	Health, education, and standard of living
Multidimensional Poverty Index (MPI)	UNDP + Oxford	Education, health, living standards

8.AGRICULTURE

Importance of Agriculture

- **Employs ~42%** of Indian workforce (2023–24 est.)
- Contributes **~16–18% of GDP**
- Backbone of **food security**, rural livelihood, and **exports**

Types of Farming in India

Type	Features
Subsistence Farming	Small land holdings; crops grown for family consumption
Commercial Farming	Large-scale, market-oriented (e.g., sugarcane, cotton)
Plantation Farming	Single cash crops on large estates (tea, coffee, rubber)
Mixed Farming	Crop + livestock on same land
Shifting Cultivation	Practiced in tribal areas (Jhum cultivation in NE India)
Organic Farming	No chemical fertilizers or pesticides used

✓ 3. Major Cropping Seasons

Season	Months	Examples of Crops
Kharif	June–Oct	Rice, Maize, Cotton, Groundnut, Bajra
Rabi	Nov–Mar	Wheat, Barley, Mustard, Gram
Zaid	April–June	Watermelon, Cucumber, Summer Vegetables

Major Government Schemes for Agriculture

Scheme	Objective
PM-KISAN	Direct income support to farmers
PMFBY	Crop insurance against natural calamities
e-NAM	Online National Agriculture Market
Soil Health Card Scheme	Improve soil fertility through nutrient analysis
Kisan Credit Card (KCC)	Easy credit to farmers
PM Krishi Sinchayee Yojana	Irrigation expansion – “Har Khet Ko Pani”

GREEN REVOLUTION IN INDIA (1966-67)

A period of rapid increase in **agricultural production**, especially **wheat and rice**, due to use of **HYV seeds**, **irrigation**, and **chemical inputs**.

Father of Green Revolution in India

- **M.S. Swaminathan**

Key Features

- Promoted use of:
 - **High-Yielding Variety seeds**
 - **Chemical fertilizers and pesticides**
 - **Irrigation** (canals & tube wells)
 - **Mechanization** (tractors, threshers)

9. LIBERALIZATION, PRIVATIZATION, AND GLOBALIZATION (LPG) – 1991 ECONOMIC REFORMS

Background

- In **1991**, India faced a **major economic crisis**:
 - High **fiscal deficit**
 - Balance of payments crisis
 - Very low forex reserves (only 2 weeks' import cover)
- India adopted **LPG reforms** under pressure from the **IMF & World Bank**.

Initiated by **Dr. Manmohan Singh** (Finance Minister), under **PM P.V. Narasimha Rao**

Liberalization

Removing government restrictions and controls on the economy to encourage private sector participation.

Key Features:

- End of **industrial licensing** (License Raj abolished)
- Removal of **quota systems** and import restrictions
- Reduction in **tariffs and taxes**
- Simplification of procedures for **FDI (Foreign Direct Investment)**
- Reforms in banking, stock markets, and financial sector

Privatization

Transfer of ownership, management, or control of public sector enterprises to **private players**.

Types of Privatization:

Type	Meaning
Disinvestment	Govt sells shares in PSUs (partial/strategic)
Strategic Sale	Govt transfers majority control to private sector
Public-Private Partnership (PPP)	Govt + private firms share investment and risk

* Examples:

- Air India privatized (sold to Tata Group, 2021)
- BPCL, LIC disinvestment initiatives

4. Globalization

Integrating the **Indian economy with the global economy** through increased trade, capital flow, and technology exchange.

* Features of Globalization:

- Reduction of **import-export barriers**
- **Opening up of economy** to **foreign investment**
- Participation in **WTO** (India joined WTO in 1995)
- Growth of **outsourcing** and **IT sector**
- Greater mobility of **capital, labor, and goods**

Aspect	Liberalization	Privatization	Globalization
Goal	Free economy from excessive controls	Increase efficiency via private sector	Integrate with world economy
Methods	Deregulation, reduced taxes, FDI liberalization	Disinvestment, strategic sales	Trade liberalization, FDI, global trade links
Impact	Boost in growth, competition	Reduced fiscal burden, improved services	More exports, foreign tech, global exposure

✓ Positive Effects	✗ Negative Effects
• Fast GDP growth (esp. post-2000)	• Rising inequality (urban vs rural)
• Boost in exports and forex reserves	• Jobless growth in some sectors
• Growth of service sector (IT, BPO)	• Over-dependence on global market
• Enhanced consumer choices and competition	• Threat to local industries
• Increase in foreign investment	• Displacement due to privatization

10. INTERNATIONAL ECONOMIC INSTITUTIONS

Institution	Focus Area	Headquarters	India's Role
IMF	Monetary stability, BoP support	Washington D.C., USA	Founding member
World Bank Group	Development financing & poverty reduction	Washington D.C., USA	Founding member
WTO	International trade rules, dispute resolution	Geneva, Switzerland	Not a founding member (joined in 1995)
ADB	Infrastructure & social dev. in Asia	Manila, Philippines	Founding member, large shareholder
NDB (BRICS Bank)	BRICS-led infrastructure finance	Shanghai, China	Founding member
AIIB	Infrastructure investment in Asia	Beijing, China	2nd largest shareholder
OECD	Policy dialogue among developed nations	Paris, France	Not a member , but key partner

GEOGRAPHY

Digital ID: 2130056

SOLAR SYSTEM

◆ 1. The Solar System Overview

Celestial Body	Details
Sun	Centre of the solar system; source of light and energy
Planets	8 total: Mercury to Neptune (orbit the Sun)
Dwarf Planets	Pluto, Ceres, Eris, Haumea, Makemake
Moons	Natural satellites; Earth has 1, Jupiter has 95+
Asteroids	Small rocky bodies; found in asteroid belt between Mars–Jupiter
Comets	Ice + dust; elliptical orbits; visible when near Sun
Meteoroids	Small rocky fragments; Meteor = burns in atmosphere; Meteorite = hits Earth

◆ 2. Planets – Quick Facts Table

Planet	Distance (from Sun)	Key Features
Mercury	1st	Smallest, no moon, hottest daytime
Venus	2nd	Brightest, rotates clockwise , no moon
Earth	3rd	Only planet with life, 1 moon
Mars	4th	Red planet, 2 moons
Jupiter	5th	Largest planet, gas giant, 95+ moons
Saturn	6th	Known for rings, 146+ moons
Uranus	7th	Rotates sideways, icy, bluish
Neptune	8th	Farthest, strong winds, bluish

◆ 3. Motions of the Earth

A. Rotation

Aspect	Details
Definition	Earth spins on its axis
Time Taken	24 hours (1 day)

Aspect	Details
Direction	West to East
Effect	Causes day and night
Speed	~1670 km/h at equator

B. Revolution

Aspect	Details
Definition	Earth's orbit around the Sun
Time Taken	365¼ days (1 year)
Orbit Shape	Elliptical
Effect	Causes seasons
Perihelion	Nearest to Sun (around Jan 3)
Aphelion	Farthest from Sun (around July 4)

◆ 4. Important Latitudes Related to Earth's Motion

Latitude	Effect Due to Tilt & Revolution
Equator (0°)	Equal day & night throughout the year
Tropic of Cancer (23.5° N)	Direct sunlight on June 21
Tropic of Capricorn (23.5° S)	Direct sunlight on Dec 22
Arctic Circle (66.5° N)	24-hr daylight on June 21
Antarctic Circle (66.5° S)	24-hr daylight on Dec 22

🧠 Earth is tilted at **23.5°** on its axis → causes **seasonal variation**

◆ 5. Equinoxes & Solstices

Date	Event	Sun Rays Fall On	Effect
March 21	Spring Equinox	Equator	Equal day & night worldwide
June 21	Summer Solstice	Tropic of Cancer	Longest day in N. Hemisphere
Sept 23	Autumn Equinox	Equator	Equal day & night
Dec 22	Winter Solstice	Tropic of Capricorn	Shortest day in N. Hemisphere

◆ 6. SSC CGL PYQ HIGHLIGHTS

- **Venus** = Brightest planet, rotates clockwise
- **Jupiter** = Largest planet
- **Earth rotates West → East**
- **Equinoxes** = Equal day & night
- **Aphelion** = Earth farthest from Sun (July)
- **Mercury** = Closest to Sun
- **Comets** = Ice and dust, elliptical orbits
- **Perihelion** = Closest to Sun (Jan 3)

INTERIOR OF THE EARTH

◆ 1. Layers of the Earth

Layer	Depth	Composition	Properties
Crust	0–35 km	Silica + Aluminium (SIAL)	Thinnest layer (5–70 km)
Mantle	35–2900 km	Silica + Magnesium (SIMA)	Semi-solid, causes convection
Core	2900–6371 km	Nickel + Iron (NIFE)	Hottest, dense, magnetic field

Crust = 1% | **Mantle** = 84% | **Core** = 15% of Earth's volume

◆ 2. Discontinuities Inside the Earth

Discontinuity	Between	Key Fact
Mohorovičić (Moho)	Crust & Upper Mantle	Discovered by Andrija Mohorovičić
Repetti Discontinuity	Upper & Lower Mantle	Less prominent
Gutenberg	Mantle & Outer Core	Identified via seismic wave behavior
Lehmann	Outer Core & Inner Core	Discovered by Inge Lehmann

◆ 3. Earthquake Waves (Seismic Waves)

Wave Type	Movement	Medium	Speed	Key Facts
P-Waves	Longitudinal (push-pull)	Solids, liquids, gases	Fastest	Arrives first, primary waves
S-Waves	Transverse (side-to-side)	Only solids	Slower	Do not pass through liquids (outer core)
L-Waves	Surface waves	Surface of Earth	Slowest	Cause maximum damage

- ✓ **Seismograph** measures waves
- ✓ **Focus** = Origin point inside Earth
- ✓ **Epicenter** = Surface point above focus
- ✓ **Richter scale** → Measures **magnitude**

◆ 4. Tectonic Plates (Lithospheric Plates)

Major Plates	Key Areas
Pacific Plate	Pacific Ocean – largest plate
Eurasian Plate	Europe, Asia
Indo-Australian Plate	India, Australia, Indian Ocean
North American Plate	North America
South American Plate	South America
African Plate	Africa and surrounding oceans

Major Plates	Key Areas
Antarctic Plate	Antarctica
Minor Plates	Region
Arabian Plate	Arabian Peninsula
Nazca Plate	West of South America
Caribbean Plate	Central America
Philippine Plate	Southeast Asia
Cocos Plate	West of Central America

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◆ 5. Plate Boundaries (Tectonic Movements)

Boundary Type	Movement	Result
Divergent	Plates move away	Rift valleys, Mid-ocean ridges
Convergent	Plates collide	Mountains, trenches, earthquakes
Transform	Plates slide past	Earthquakes along fault lines

🧠 Indian plate collides with Eurasian → Himalayas formation

◆ 6. Theories of Earth's Movement

Theory	Scientist	Key Idea
Continental Drift	Alfred Wegener	Continents were once part of supercontinent (Pangaea) and drifted apart
Sea Floor Spreading	Harry Hess	New crust formed at ocean ridges, pushing continents

Theory	Scientist	Key Idea
Plate Tectonics	Based on above two	Earth's lithosphere is divided into moving plates

◆ 7. Volcanoes

Type	Feature	Examples
Active	Frequently erupting	Mauna Loa (Hawaii), Mt. Etna (Italy)
Dormant	Sleeping but may erupt again	Mt. Fuji (Japan)
Extinct	No eruption in historic times	Mt. Kilimanjaro (Africa)

 **Volcano Parts:** Crater, Vent, Magma chamber, Cone

◆ 8. Earthquake & Volcano Zones

Zone	Features
Pacific Ring of Fire	Most active EQ + volcano zone (Japan, Alaska, Andes)
Mid-Atlantic Ridge	Divergent boundary, underwater volcanoes
Himalayan Belt	Convergent boundary → major earthquakes
Andaman-Nicobar Region	Subduction zone → volcanic + seismic activity

◆ 9. SSC CGL PYQ HIGHLIGHTS

- **Moho Discontinuity** = Between crust & mantle
- **S-waves** do **not** pass through liquids
- **P-waves** = Fastest seismic waves
- **Pacific Plate** = Largest tectonic plate
- **Mt. Fuji** = Dormant volcano in Japan
- **Lehmann Discontinuity** = Between inner and outer core
- **Wegener** = Proposed **continental drift**
- **Nazca Plate** = Subducting under South America → Andes
- **Focus vs Epicenter** = Repeated in SSC exams

OCEANOGRAPHY

◆ 1. TIDES

Tide Type	Occurs When	Effect
High Tide	Moon's gravity pulls ocean water strongly	Sea level rises
Low Tide	Water falls back due to gravity on other side	Sea level falls
Spring Tide	Earth–Moon–Sun aligned (New/Full Moon)	Highest high tides
Neap Tide	Moon at right angle to Earth–Sun (1st & 3rd Quarter)	Lowest high tides

💡 Tides occur **twice daily**, important for **navigation, fishing, ports**.

◆ 2. OCEAN CURRENTS

✓ A. What Are Ocean Currents?

- Large-scale horizontal movement of sea water in specific direction
- Influenced by **wind, Earth's rotation, salinity, temperature**

Current	Region / Coast
North/South Equatorial	Along the equator (Pacific, Atlantic)

✓ B. List of Major Warm Currents

Current	Region / Coast
Gulf Stream	East USA – Atlantic Ocean
North Atlantic Drift	West Europe
Kuroshio Current	East Japan – Pacific
Brazil Current	East South America – Atlantic
Agulhas Current	East Africa – Indian Ocean
East Australian Current	East Australia – Pacific

✓ C. List of Major Cold Currents

Current	Region / Coast
Canary Current	NW Africa – Atlantic Ocean
Labrador Current	NE Canada – Atlantic Ocean
Humboldt/Peru Current	West South America – Pacific
Benguela Current	West Africa – Atlantic Ocean
California Current	West USA – Pacific Ocean
Oyashio Current	East Russia – Pacific
West Australian Current	West Australia – Indian Ocean

- ✓ **Fishing Grounds** at mixing zones (e.g. Japan: **Kuroshio + Oyashio**)

◆ 3. OCEAN FLOOR RELIEF FEATURES

The ocean floor is **not flat**, it has varied landforms like continents.

Feature	Description
Continental Shelf	Shallow seabed near coasts; rich in oil & fish
Continental Slope	Steep slope after shelf
Continental Rise	Gentle slope between slope & abyssal plain
Abyssal Plain	Deep, flat floor; sediment-covered
Mid-Ocean Ridge	Undersea mountain range (volcanic, divergent)
Oceanic Trench	Deepest depression; formed at subduction zones
Seamounts	Underwater volcanoes
Guyots	Flat-topped submerged seamounts
Submarine Canyons	Deep V-shaped valleys cut into slope

- ✓ **Deepest Ocean Trenches**

Trench	Ocean	Depth (~m)
Mariana Trench	Pacific	~11,034
Tonga Trench	Pacific	~10,800
Puerto Rico Trench	Atlantic	~8,600

◆ 4. OCEAN SALINITY

Aspect	Details
Definition	Amount of salt per 1000g of seawater
Average Salinity	~35 ppt (parts per thousand)
High Salinity	Tropics, Red Sea, Mediterranean Sea
Low Salinity	Equator (rainfall), Polar regions

- ✓ **Factors Affecting Salinity:**

- **↑ Evaporation** → ↑ Salinity (Hot deserts)
- **↑ Rainfall / River Inflow** → ↓ Salinity
- **↑ Temperature** → ↑ Evaporation → ↑ Salinity
- **Polar melt water** → ↓ Salinity

◆ 5. OCEAN ZONES (Based on Sunlight & Depth)

Zone	Depth	Light Availability
Epipelagic (Sunlit)	0–200 m	Full sunlight, photosynthesis
Mesopelagic (Twilight)	200–1000 m	Dim light, no photosynthesis
Bathypelagic (Midnight)	1000–4000 m	No light

Zone	Depth	Light Availability
Abyssopelagic	4000–6000 m	Freezing, high pressure
Hadalpelagic	>6000 m (trenches)	Deepest, trench zones

◆ 6. MAJOR OCEANS – QUICK SNAPSHOT

Ocean	Rank	Notable Points
Pacific	1st	Largest, deepest, Ring of Fire
Atlantic	2nd	S-shaped, busiest trade route
Indian Ocean	3rd	Warmest, monsoon influence
Southern Ocean	4th	Surrounds Antarctica
Arctic	5th	Smallest, shallowest, ice-covered

ATMOSPHERE

◆ 1. What is Atmosphere?

- Blanket of **gases surrounding Earth**
- Held by gravity
- Extends ~1,000 km, but **most mass lies within 50 km**

◆ 2. Composition of Atmosphere

Gas	Percentage by Volume
Nitrogen (N ₂)	78%
Oxygen (O ₂)	21%
Argon	0.93%
Carbon Dioxide (CO ₂)	0.04%
Others	Trace gases (neon, helium, ozone, etc.)

◆ 3. Structure: Layers of the Atmosphere

Layer	Height	Key Features
Troposphere	0–12 km	Weather forms here; temp. ↓ with height
Stratosphere	12–50 km	Contains ozone layer ; planes fly here
Mesosphere	50–80 km	Coldest layer; burns meteors
Thermosphere	80–500 km	Auroras seen here; ionosphere → radio waves
Exosphere	500 km+	Merges with space; lightest gases (H, He)

◆ 4. Air Pressure Belts (Global)

Latitude Zone	Pressure Belt	Characteristics
0° (Equator)	Equatorial Low Pressure	Hot, rising air → heavy rainfall
30° N/S	Subtropical High Pressure	Dry, sinking air → deserts
60° N/S	Subpolar Low Pressure	Stormy areas (cyclones)
90° N/S (Poles)	Polar High Pressure	Cold, sinking air

✓ Winds always blow **from high pressure → low pressure**

◆ 5. Planetary Winds (Permanent Winds)

Wind Type	Direction	Between
Trade Winds	East to West	30° → 0° (Tropics)
Westerlies	West to East	30° → 60°
Polar Easterlies	East to West	90° → 60°

◆ 6. Local Winds

Wind Name	Location	Effect
Loo	North India (Summer)	Hot, dry wind
Chinook	USA, Canada (Rockies)	Warm snow-melting wind
Mistral	France	Cold, dry wind
Foehn	Alps (Europe)	Warm downslope wind
Harmattan	West Africa	Dry wind from Sahara

◆ 7. Jet Streams

- High-speed winds (250–400 km/hr) in **upper troposphere**
- Influence monsoon & airplane routes

◆ 8. SSC CGL PYQ HIGHLIGHTS

- **Troposphere** = Weather formation
- **Stratosphere** = Ozone layer & aircrafts
- **Equator** = Low pressure, rising air
- **30° latitude** = Subtropical high pressure → **deserts**
- **Trade Winds** blow **east to west**
- **Westerlies** → **main wind belt of mid-latitudes**
- **Jet Streams** affect Indian **monsoon**
- **Loo** = hot summer wind in India

WORLD PHYSICAL GEOGRAPHY

◆ 1. Continents of the World

Continent	Key Facts
Asia	Largest continent; Mt. Everest; Gobi Desert; Yangtze River
Africa	2nd largest; Sahara Desert; Nile River; Equator crosses it
North America	3rd largest; Rocky Mountains; Mississippi River
South America	Andes Mountains; Amazon River; Atacama Desert
Antarctica	Ice-covered; coldest; no permanent population
Europe	Smallest after Australia; Alps Mountains; Danube River
Australia	Smallest continent; Great Barrier Reef; Great Dividing Range

◆ 2. Major Landforms of the Earth

Landform	Definition	Examples
Mountains	High elevation, steep slopes	Himalayas, Rockies, Alps

Landform	Definition	Examples
Plateaus	Elevated flat land	Deccan Plateau, Colorado Plateau
Plains	Flat, low-lying areas	Indo-Gangetic Plain, Great Plains
Deserts	Dry areas with low rainfall	Sahara, Gobi, Atacama
Valleys	Low land between hills/mountains	Rift Valley (Africa)
Islands	Land surrounded by water	Greenland, Madagascar, Sri Lanka
Peninsulas	Land surrounded by water on 3 sides	India, Arabia, Korea
Isthmus	Narrow strip connecting two larger land areas	Isthmus of Panama
Strait	Narrow water body connecting two seas	Strait of Gibraltar, Palk Strait

◆ 3. Highest Mountain Peaks (by Continent)

Continent	Highest Peak	Height (m)	Location
Asia	Mt. Everest	8,848	Nepal/China
South America	Aconcagua	6,961	Argentina (Andes)
North America	Denali (McKinley)	6,190	Alaska, USA
Africa	Kilimanjaro	5,895	Tanzania
Europe	Mt. Elbrus	5,642	Russia (Caucasus)
Antarctica	Mt. Vinson	4,892	Antarctica
Australia	Mt. Kosciuszko	2,228	Australia

◆ 4. Longest Rivers (by Continent)

Continent	River	Length	Notable Fact
Africa	Nile	~6,650 km	Longest river in the world
South America	Amazon	~6,400 km	Largest by volume
Asia	Yangtze	~6,300 km	Longest in Asia (China)
North America	Mississippi-Missouri	~6,275 km	Flows through USA
Europe	Volga	~3,530 km	Longest in Europe (Russia)
Australia	Murray-Darling	~3,672 km	Longest in Australia

◆ 5. Major Deserts of the World

Desert	Continent	Type	Notable Facts
Sahara	Africa	Hot Desert	Largest hot desert in the world
Gobi	Asia (Mongolia)	Cold Desert	Harsh winters
Atacama	South America	Coastal Desert	Driest place on Earth
Kalahari	Africa	Semi-arid	Found in Botswana
Thar	Asia (India/Pak)	Hot Desert	India's only desert
Patagonian	South America	Cold Desert	Found in Argentina

◆ 6. Important Straits

Strait	Connects	Location
Strait of Gibraltar	Atlantic Ocean & Mediterranean Sea	Between Europe & Africa
Palk Strait	Bay of Bengal & Gulf of Mannar	India and Sri Lanka
Bering Strait	Pacific Ocean & Arctic Ocean	Russia and Alaska
Malacca Strait	Indian Ocean & South China Sea	Between Malaysia and Indonesia

◆ 7. Major Oceans of the World

Ocean	Size Rank	Notable Points
Pacific Ocean	1st (largest)	Mariana Trench (deepest point)
Atlantic Ocean	2nd	Sargasso Sea, busiest shipping routes
Indian Ocean	3rd	Warmest ocean, monsoon influence
Southern Ocean	4th	Surrounds Antarctica
Arctic Ocean	5th (smallest)	Ice-covered, shallowest

◆ 8. SSC CGL PYQ HIGHLIGHTS

- **Mt. Everest** = Highest peak in the world
- **Nile** = Longest river
- **Sahara** = Largest hot desert

- **Gobi** = Cold desert in Asia
- **Atacama** = Driest desert
- **Strait of Gibraltar** = Connects Atlantic & Mediterranean
- **Pacific Ocean** = Largest and deepest ocean

HEAT BUDGET OF THE EARTH

◆ What is the Heat Budget?

The **Heat Budget** explains how the **Earth maintains its temperature balance** by:

- **Receiving solar energy** from the Sun (incoming radiation)
- **Losing energy** to space (outgoing radiation)

The balance between **incoming and outgoing radiation** = **Earth's Heat Budget**

◆ Components of Earth's Heat Budget

Component	% of Incoming Solar Radiation	What Happens
Incoming solar radiation (Insolation)	100%	Total energy from Sun reaching Earth's atmosphere
Reflected by clouds	~20%	Reflected back to space by clouds
Reflected by atmosphere (dust/gases)	~6%	Scattered/reflected by air molecules
Reflected by Earth's surface (albedo)	~4%	Snow, deserts reflect sunlight
Total reflected (Albedo)	~30%	Albedo = total reflectivity of Earth
Absorbed by atmosphere	~14%	Gases like CO ₂ , O ₃ absorb part of solar energy
Absorbed by Earth's surface	~51%	Warms land, oceans → radiates back as heat
Total absorbed	~65%	Heats up Earth + atmosphere

💡 **Incoming = Outgoing** → Earth's average temperature stays balanced.

◆ How Earth Loses Heat (Outgoing Radiation)

- **Earth re-emits absorbed heat as long-wave (infrared) radiation**
- Atmosphere absorbs part of it; some escapes into space

- **Greenhouse gases** (CO₂, CH₄, H₂O vapor) **trap heat** → **greenhouse effect**

◆ **Greenhouse Effect (Important)**

Effect	Explanation
Natural	Keeps Earth warm and habitable (~15°C avg)
Enhanced (human-made)	Due to pollution, excessive CO ₂ , causes global warming

◆ **Albedo – Reflectivity of Earth's Surface**

Surface	Albedo Value (approx)
Fresh snow	High (~80–90%)
Desert (sand)	Moderate (~30–40%)
Forest/Ocean	Low (~10–15%)

🧠 **Higher albedo = more reflection = less heat absorption**

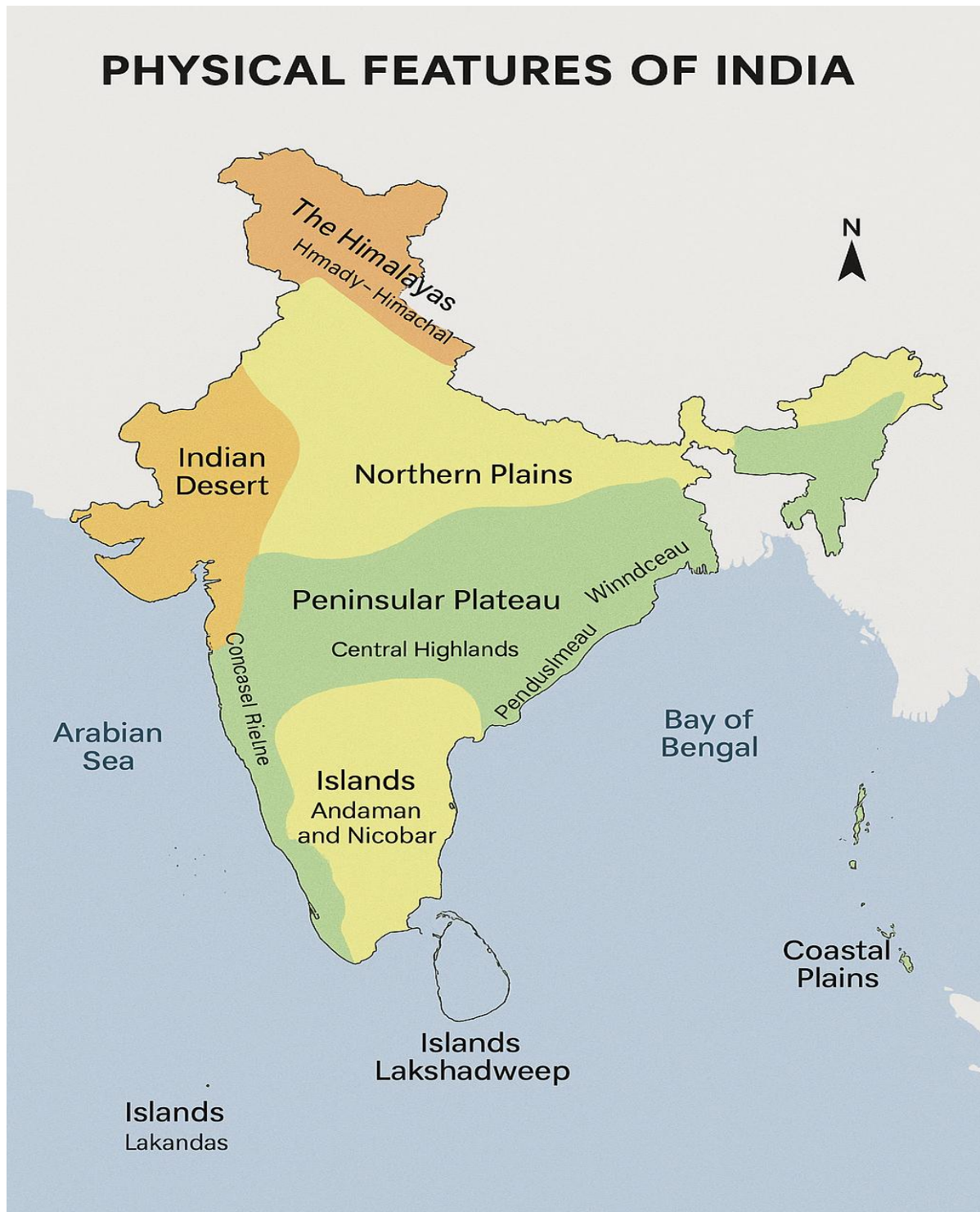
◆ **SSC CGL PYQ Highlights**

- **Heat budget** = Balance between incoming & outgoing radiation
- **Albedo** = Reflectivity of Earth (PYQ)
- **Greenhouse effect** = Causes **global warming** (PYQ)
- **Major greenhouse gases** = CO₂, CH₄, water vapor
- **51% of solar energy** = absorbed by **Earth's surface**
- **Total reflection** = ~30% (PYQ)
- **Incoming solar radiation** = Called **insolation**

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PHYSICAL FEATURES OF INDIA



◆ 1. Major Physical Divisions of India

India's land is divided into **six major physical divisions**:

Division	Key Features
1. The Himalayas	Young fold mountains; northern border of India
2. Northern Plains	Flat, fertile plains formed by Indus-Ganga rivers
3. Peninsular Plateau	Oldest landmass; made of hard igneous rocks
4. Indian Desert	Sandy, arid region; low rainfall; Thar Desert
5. Coastal Plains	Narrow plains along eastern & western coasts
6. Islands	Group of islands in Bay of Bengal & Arabian Sea

◆ 2. The Himalayas

- Formed by **collision of Indian & Eurasian plates**
- Three parallel ranges:

Range	Features
Himadri (Greater Himalayas)	Highest range; snow-covered; Mt. Everest, Kanchenjunga
Himachal (Lesser Himalayas)	Famous hill stations; moderate elevation
Shiwalik (Outer Himalayas)	Youngest; foothills; prone to landslides

- Longitudinal Divisions: Punjab Himalaya, Kumaon, Nepal, Assam Himalaya

◆ 3. Northern Plains

- Formed by **alluvial deposits** of rivers: Indus, Ganga, Brahmaputra
- Extremely fertile**; densely populated
- Divided into:

Region	Location
Punjab Plains	Western part (Indus basin)
Ganga Plains	Central part (Ganga basin)
Brahmaputra Plains	Eastern part (Assam, NE)

◆ 4. Peninsular Plateau

- Oldest & most stable landmass**
- Rich in **minerals**
- Divided into:

Region	Location
Central Highlands	Malwa Plateau, Bundelkhand
Deccan Plateau	Triangular; between Western & Eastern Ghats

- Western Ghats → Steep, high; source of rivers
- Eastern Ghats → Discontinuous, lower

◆ 5. Indian Desert (Thar Desert)

- Located in **Rajasthan**
- River Luni is the only major river**
- Low rainfall (<150 mm/year)**

◆ 6. Coastal Plains

Plain	Features
Western Coast	Narrow, rocky, includes Konkan & Malabar
Eastern Coast	Wide, fertile, includes Coromandel & Northern Circar

- **Deltas:** Mahanadi, Godavari, Krishna, Cauvery (East coast)

◆ 7. Islands

Group	Location	Features
Andaman & Nicobar	Bay of Bengal	Volcanic islands; Indira Point (southernmost)

Group	Location	Features
Lakshadweep	Arabian Sea	Coral islands; small and flat

◆ 8. SSC CGL PYQ HIGHLIGHTS

- Himalayas formed by **plate tectonic collision**
- Northern Plains → made of **alluvial soil**
- **Western Ghats** → higher than Eastern Ghats
- **Thar Desert** → located in **Rajasthan**, River **Luni**
- **Deccan Plateau** → between two ghats
- **Indira Point** → southernmost point of India (Nicobar)

MOUNTAINS, PLATEAUS & HILLS OF INDIA

◆ 1. Major Mountain Ranges of India

Range	Location	Key Features / Peaks
Himalayas	North India (J&K to Arunachal)	Young fold mountains; highest in the world
Shivaliks	Outer Himalayas	Lowest range of Himalayas
Lesser Himalayas	Middle Himalayas	Hill stations (Shimla, Mussoorie)
Greater Himalayas	Inner Himalayas	Highest peaks (Everest, Kanchenjunga)
Trans-Himalayas	Ladakh region	Karakoram, Zaskar ranges
Aravalli Range	Rajasthan to Delhi	Oldest fold mountain; Mt. Abu highest peak
Vindhya Range	Central India (MP)	Marks north boundary of Deccan Plateau

Range	Location	Key Features / Peaks
Satpura Range	South of Vindhya	Between Narmada & Tapi rivers
Western Ghats	Western edge of Deccan	High rainfall; UNESCO World Heritage Site
Eastern Ghats	Eastern coast	Discontinuous; lower than Western Ghats

◆ 2. Important Mountain Peaks

Peak	Height (m)	State/Region	Range
Kanchenjunga	8,586	Sikkim	Himalayas
Nanda Devi	7,816	Uttarakhand	Himalayas
Kamet	7,756	Uttarakhand	Himalayas
Guru Shikhar	1,722	Rajasthan (Mt. Abu)	Aravallis
Anamudi	2,695	Kerala	Western Ghats
Doddabetta	2,637	Tamil Nadu (Nilgiris)	Nilgiri Hills
K2 (Godwin Austen)	8,611	POK (Karakoram)	Karakoram

◆ 3. Major Plateaus of India

Plateau	Location	Features
Deccan Plateau	South India	Largest plateau, rich in black soil
Chotanagpur Plateau	Jharkhand, Odisha, WB	Mineral-rich (coal, iron, bauxite)
Malwa Plateau	MP, Rajasthan	Between Aravalli & Vindhya
Meghalaya Plateau	Meghalaya	Extension of Deccan; Khasi, Garo, Jaintia
Baghelkhand Plateau	MP, UP	Between Vindhya & Chotanagpur

◆ 4. Famous Hills of India

Hills	State	Part of
Nilgiri Hills	TN, Kerala, Karnataka	Western Ghats
Cardamom Hills	Kerala	Western Ghats
Shevaroy Hills	Tamil Nadu (Yercaud)	Eastern Ghats
Rajmahal Hills	Jharkhand	Eastern edge of Chotanagpur
Lushai Hills	Mizoram	Patkai Range
Mikir Hills	Assam	South of Kaziranga
Ajanta-Satpura Hills	Maharashtra	Central India

◆ 5. SSC CGL PYQ HIGHLIGHTS

- **Kanchenjunga** = Highest peak within India
- **K2** = Highest peak in **Indian subcontinent** (in POK)
- **Aravalli Range** = Oldest mountain range in India
- **Western Ghats** = Higher, continuous, rich in biodiversity

- **Eastern Ghats** = Discontinuous & lower than Western Ghats
- **Chotanagpur Plateau** = Mineral-rich region
- **Anamudi** = Highest peak in **South India**
- **Nilgiris** = Meeting point of Western & Eastern Ghats

MAJOR RIVERS OF INDIA – ORIGIN, STATE, TRIBUTARIES

River	Origin Point	State	Major Tributaries
Indus	Lake Mansarovar (Tibet)	Tibet	Zaskar, Shyok, Jhelum, Chenab, Ravi, Beas, Sutlej
Jhelum	Verinag Spring (Pir Panjal)	Jammu & Kashmir	Lidder, Sindh
Chenab	Baralacha Pass (Chandra + Bhaga confluence)	Himachal Pradesh	Tawi, Marusudar, Jhelum

River	Origin Point	State	Major Tributaries
Ravi	Kullu Hills near Rohtang Pass	Himachal Pradesh	Budhil, Seul
Beas	Beas Kund near Rohtang Pass	Himachal Pradesh	Banganga, Luni, Parbati
Sutlej	Lake Rakshastal (Tibet)	Tibet	Spiti, Baspa, Nogli Khad
Ganga	Gangotri Glacier (Gaumukh)	Uttarakhand	Yamuna, Ghaghara, Gandak, Kosi, Ramganga, Son
Yamuna	Yamunotri Glacier (Bandarpunch Peak)	Uttarakhand	Chambal, Betwa, Ken, Tons, Sindh
Ghaghara	Matsatung Glacier (Tibet/Nepal)	Tibet/Nepal	Rapti, Sarda, Kuwana
Gandak	North of Dhaulagiri Peak (Nepal Himalayas)	Nepal	Burhi Gandak, Trijuga
Kosi	Angsi Glacier, Tibet (joins Arun & Sun Kosi)	Tibet/Nepal	Arun, Tamur, Sun Kosi
Brahmaputra	Chemayungdung Glacier (Angsi Glacier), Kailash Range	Tibet	Dibang, Lohit, Subansiri, Dhansiri

♦ Peninsular Rivers

River	Origin Point	State	Major Tributaries
Mahanadi	Sihawa Hills (Raipur district)	Chhattisgarh	Seonath, Jonk, Hasdeo, Mand
Godavari	Trimbak Plateau (Nashik)	Maharashtra	Purna, Pranhita, Indravati, Manjira, Sabari
Krishna	Mahabaleshwar (Western Ghats)	Maharashtra	Bhima, Tungabhadra, Koyna, Musi, Ghataprabha
Kaveri	Tala Kaveri (Brahmagiri Hills, Western Ghats)	Karnataka	Hemavati, Amravati, Kabini, Bhavani
Narmada	Amarkantak Plateau (Maikala Hills)	Madhya Pradesh	Tawa, Hiran, Orsang, Barna
Tapi	Multai (Satpura Range)	Madhya Pradesh	Purna, Girna, Panjhra, Aner

River	Origin Point	State	Major Tributaries
Sabarmati	Mewar Hills (Aravalli, Udaipur)	Rajasthan	Sei, Wakal
Pennar	Nandi Hills	Karnataka	Chitravathi, Papagni
Subarnarekha	Ranchi Plateau	Jharkhand	Kharkai, Kanchi
Baitarani	Guptaganga Hills (Keonjhar)	Odisha	Salandi, Matai

CLIMATE OF INDIA

◆ 1. Weather vs Climate

Term	Definition
Weather	Day-to-day atmospheric conditions
Climate	Average weather over a long period (30+ years)

- Latitude (Tropic of Cancer passes through middle)
- Himalayas (block cold winds)
- Relief features (e.g., Western Ghats cause orographic rain)
- Distance from sea (continental vs coastal effect)

◆ 2. Climate of India

- India has a **monsoon-type climate**.
- Influenced by:

- **Jet streams (westerly jet stream causes western disturbances)**

◆ 3. Seasons in India

Season	Months	Features
Cold Weather Season	Dec–Feb	Cold, dry winds; clear skies
Hot Weather Season	Mar–May	High temperatures, dry heat (loo)
South-West Monsoon	Jun–Sep	Heavy rain from Arabian Sea & Bay of Bengal branches
Retreating Monsoon	Oct–Nov	Post-monsoon showers in south India (e.g., Tamil Nadu)

◆ 4. Indian Monsoon

- **Monsoon:** Seasonal reversal of wind
- **Southwest Monsoon (SWM):** June–September
 - **Arabian Sea Branch:** Hits Kerala coast first (~June 1)
 - **Bay of Bengal Branch:** Moves to NE and Indo-Gangetic plains
- **Northeast Monsoon:** October–November
 - Blows from land to sea (dry winds)
 - Tamil Nadu receives **maximum rainfall** in this season

◆ 5. Rainfall in India

Type	Details
Orographic	Caused by moist air hitting mountains (e.g., Western Ghats)
Convectional	Local heating → rising air → rainfall (common in summer)
Cyclonic	Due to western disturbances (mainly in North India in winter)

◆ 6. Rainfall Distribution

Region	Rainfall Category	Rainfall (mm)
Meghalaya (Mawsynram)	Highest rainfall	> 11,000 mm/year
Rajasthan (Thar Desert)	Lowest rainfall	< 250 mm/year
Western Ghats (windward)	Heavy rainfall	> 2000 mm
Tamil Nadu (Oct–Nov)	Retreating monsoon rain	400–600 mm (seasonal)

◆ 7. SSC CGL PYQ HIGHLIGHTS

- **Mawsynram** (Meghalaya) = **Highest rainfall in the world**
- **Loo** = Hot, dry wind in northern India (pre-monsoon)
- **Western disturbances** → Winter rain in NW India
- **SW Monsoon** = June to Sept, from Arabian Sea + Bay of Bengal
- **Tamil Nadu** → Gets winter rain due to **Northeast Monsoon**
- **Tropic of Cancer** passes through **8 Indian states**

SOIL TYPES IN INDIA

◆ 1. What is Soil?

Uppermost layer of the earth's crust that supports **plant growth**.

Formed by **weathering of rocks** over time (pedogenesis).

◆ 2. Major Soil Types in India

Soil Type	Formation / Found In	Features	Crops Grown
Alluvial Soil	Deposited by rivers (Ganga, Brahmaputra, Indus)	Fertile, contains potash & lime	Rice, wheat, sugarcane, pulses
Black Soil	Deccan Plateau (lava origin – Maharashtra, MP, Gujarat)	Moisture-retentive, rich in calcium & magnesium	Cotton (called Regur soil), soybean
Red Soil	Weathered igneous rocks (TN, AP, Karnataka, Odisha)	Less fertile, low in nitrogen, acidic	Millets, groundnut, pulses
Laterite Soil	High rainfall areas with leaching (Kerala, NE, MH)	Poor in nutrients, rich in iron & aluminum	Cashew, coffee
Arid Soil	Rajasthan, Gujarat (desert regions)	Sandy, low moisture, high salt content	Millets, barley with irrigation
Mountain Soil	Himalayan regions (J&K, HP, NE states)	Thin, acidic, organic-rich (in valleys)	Tea, coffee, fruits
Peaty/Marshy Soil	Waterlogged, swampy areas (Sundarbans, Kerala)	High organic matter, black in color	Paddy, jute

◆ 3. Additional Notes

• Alluvial Soil:

- **Khadar**: New, fertile, found near rivers
- **Bhangar**: Old alluvium, less fertile, higher in elevation

• Black Soil:

- Cracks in summer → good aeration

- Clayey texture, swells when wet

• Laterite:

- Name from Latin *later* meaning **brick**
- Formed by **intense leaching** in tropical climates

◆ 4. Soil Conservation Methods

Method	Description
Contour Ploughing	Ploughing along slope lines
Terracing	Step-like fields on hills
Afforestation	Planting trees to bind soil
Strip Cropping	Alternating strips of crops to reduce erosion

- **Alluvial soil** = most widespread (Indo-Gangetic plain)
- **Black soil** = ideal for **cotton** (called **Regur soil**)
- **Red soil** = poor in nitrogen, formed from **igneous rocks**
- **Laterite soil** = undergoes **leaching**
- **Peaty soil** = rich in organic matter, found in **Sundarbans**
- **Arid soil** = sandy, low fertility, found in **deserts**

◆ 5. SSC CGL PYQ HIGHLIGHTS

NATURAL VEGETATION, WILDLIFE & BIOSPHERE RESERVES

◆ 1. Types of Natural Vegetation in India (Quick Recap)

Type	Rainfall	Regions	Examples
Tropical Evergreen	> 200 cm	Western Ghats, NE India, Andamans	Ebony, rosewood, mahogany
Tropical Deciduous	100–200 cm	Central India, foothills, plains	Teak, sal, shisham
Thorn Forests & Scrubs	< 70 cm	Rajasthan, Gujarat, MP	Babool, acacia, khejri
Montane Forests	Altitude-based	Himalayas	Pine, oak, deodar, fir
Mangrove Forests	Tidal areas	Sundarbans, Godavari delta, Mahanadi delta	Sundari tree

◆ 2. Major National Parks of India

National Park	State	Famous For
Jim Corbett	Uttarakhand	First NP, Tigers
Kaziranga	Assam	One-horned Rhinoceros

National Park	State	Famous For
Manas	Assam	Tiger, Elephant, UNESCO site
Ranthambore	Rajasthan	Tigers
Keoladeo Ghana	Rajasthan	Migratory Birds (UNESCO site)
Gir Forest	Gujarat	Asiatic Lion
Sundarbans	West Bengal	Royal Bengal Tiger, Mangroves
Periyar	Kerala	Elephants, Western Ghats
Bandipur	Karnataka	Tigers, Elephants
Kanha	Madhya Pradesh	Barasingha (Swamp Deer)
Pench	Madhya Pradesh	Basis for <i>The Jungle Book</i>
Satpura	Madhya Pradesh	Sloth Bear, Tiger
Similipal	Odisha	Tigers, Elephants
Valley of Flowers	Uttarakhand	Alpine flora, seasonal bloom
Hemis	Ladakh (UT)	Snow Leopard

◆ 3. Famous Wildlife Sanctuaries

Wildlife Sanctuary	State	Famous For
Bhadra	Karnataka	Tiger, Elephant
Chilka (Nalabana)	Odisha	Migratory birds, flamingos
Wayanad	Kerala	Elephants, spotted deer
Dandeli	Karnataka	Black Panther, Hornbills
Sariska	Rajasthan	Tigers
Nameri	Assam	Elephants, Birds
Pong Dam Lake	Himachal Pradesh	Wetland birds
Kutch Desert	Gujarat	Wild ass, Desert fox
Koundinya	Andhra Pradesh	Elephants

◆ 4. Biosphere Reserves in India (Selected & Important)

Biosphere Reserve	State(s)	Notable Features / Species
Nilgiri	TN, Kerala, Karnataka	First BR in India (1986), Lion-tailed macaque
Sundarbans	West Bengal	Mangroves, Royal Bengal Tiger
Nanda Devi	Uttarakhand	Valley of Flowers, Himalayan biodiversity
Gulf of Mannar	Tamil Nadu	Coral reefs, dugongs
Pachmarhi	Madhya Pradesh	Sal forest, Leopard
Similipal	Odisha	Tigers, Sal trees
Great Nicobar	Andaman & Nicobar Islands	Saltwater crocodile, tropical rainforest
Khangchendzonga	Sikkim	Snow Leopard, Red Panda
Achanakmar-Amarkantak	Chhattisgarh, MP	Tigers, Rich biodiversity
Agasthyamalai	Kerala, TN	Endemic plants, Medicinal flora

✓ Currently **18 biosphere reserves** in India; 12 of them are part of the **UNESCO World Network**.

◆ 5. Conservation Efforts

Initiative	Objective
Project Tiger	(1973) Protect endangered tigers
Project Elephant	(1992) Elephant conservation
Wildlife Protection Act	(1972) Legal protection to endangered species
Eco-development Programs	People participation in conservation

◆ 6. SSC CGL PYQ HIGHLIGHTS

- **Kaziranga NP** → One-horned Rhino
- **Gir NP** → Only home of **Asiatic Lion**
- **Sundarbans** → Tiger + Mangroves + UNESCO

- **Valley of Flowers** → Himalayan alpine flora
- **Project Tiger** launched in **1973**
- **Wildlife Protection Act** → Enacted in **1972**

AGRICULTURE IN INDIA

◆ 1. Importance of Agriculture

- **Largest livelihood provider** in India (~50% of workforce)
- Contributes ~**17-18% to GDP**
- Basis of **food security, employment, rural development**

◆ 2. Types of Farming in India

Type	Features	Examples
Subsistence Farming	Small land, family labor, low yield	Bihar, UP, Assam
Commercial Farming	High input, large area, cash crops	Punjab (wheat), Gujarat (cotton)
Plantation Farming	Single crop, large estates, for export	Assam (tea), Kerala (coffee)
Intensive Farming	High input on small land to get max output	UP, West Bengal
Shifting Cultivation	Forest lands cleared, crops grown temporarily	Called <i>Jhum</i> (NE India)

◆ 3. Cropping Seasons in India

Season	Months	Crops Grown
Kharif	June–October	Rice, maize, millets, cotton, groundnut
Rabi	October–March	Wheat, barley, mustard, peas
Zaid	March–June (short)	Watermelon, cucumber, fodder crops

◆ 4. Major Crops and Conditions

Crop	Type	Temperature	Rainfall	Soil	Leading States
Rice	Kharif	25–30°C	100–200 cm	Alluvial, clayey	WB, UP, Punjab, Tamil Nadu

Crop	Type	Temperature	Rainfall	Soil	Leading States
Wheat	Rabi	10–25°C	75–100 cm	Loamy, alluvial	Punjab, Haryana, UP, MP
Millets	Kharif	20–30°C	50–100 cm	Poor, sandy, black	Rajasthan, Karnataka, MH
Maize	Kharif/Rabi	21–27°C	60–120 cm	Well-drained fertile	Bihar, Karnataka, UP
Sugarcane	Annual crop	21–27°C	75–150 cm	Alluvial, loamy	UP, MH, Karnataka, Tamil Nadu
Cotton	Kharif	21–30°C	60–120 cm	Black (regur) soil	MH, Gujarat, Telangana, Punjab
Tea	Plantation	20–30°C	150–250 cm	Laterite, loamy, acidic	Assam, WB, Kerala, TN
Coffee	Plantation	15–28°C	150–200 cm	Well-drained loamy	Karnataka, Kerala, TN
Oilseeds	Kharif/Rabi	Varies	50–100 cm	Varies	Gujarat, MP, Rajasthan
Pulses	Rabi/Kharif	20–25°C	50–75 cm	Sandy-loam	MP, UP, Maharashtra

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◆ 5. Irrigation in India

Type of Irrigation	Description	Used In
Canal Irrigation	Uses diverted river water through canals	Punjab, UP, Haryana
Well & Tube Wells	Groundwater-based (shallow or deep)	UP, Bihar, Tamil Nadu
Tank Irrigation	Stored rainwater in artificial tanks	South India – Andhra Pradesh, TN
Drip Irrigation	Water delivered drop by drop (saves water)	Used in dry areas, horticulture
Sprinkler Irrigation	Water sprayed like rainfall	Rajasthan, Haryana, Maharashtra

◆ 6. Agricultural Problems in India

- Small fragmented landholdings
- Dependency on monsoons
- Low productivity per hectare
- Soil degradation & overuse of fertilizers

◆ 7. Government Support

Scheme / Body	Purpose
ICAR	Indian Council of Agricultural Research
KCC (Kisan Credit Card)	Easy loan to farmers
PM-KISAN	₹6000/year direct income support
MSP (Minimum Support Price)	Price assurance for crops

◆ 8. SSC CGL PYQ HIGHLIGHTS

- **Rice** = Major Kharif crop, needs standing water
- **Wheat** = Rabi crop, grown in **cool & dry** season
- **Cotton** grows in **black soil** of Deccan
- **Millets** = Coarse grains grown in dry areas
- **Tea** = Plantation crop, NE India, acidic soil
- **Drip irrigation** = Water-saving, used in Maharashtra & Gujarat
- **ICAR** = Agriculture research body under Govt. of India

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MINERALS & ENERGY RESOURCES

◆ 1. Types of Minerals

Category	Examples
Metallic	Iron, copper, bauxite, manganese, zinc
Non-metallic	Mica, limestone, gypsum, potash
Energy minerals	Coal, petroleum, natural gas, uranium

◆ 2. Major Metallic Minerals

Mineral	State(s)	Uses
Iron ore	Odisha (Keonjhar), Chhattisgarh (Bailadila), Jharkhand (Singhbhum), Karnataka (Bellary)	Steel industry
Manganese	Maharashtra, Odisha, Karnataka	Steel & battery production

Mineral	State(s)	Uses
Bauxite	Jharkhand, Chhattisgarh, MP, Odisha	Aluminum production
Copper	Rajasthan (Khetri), Jharkhand (Singhbhum), MP	Electrical wires, alloys
Zinc & Lead	Rajasthan (Zawar mines)	Alloys, batteries
Gold	Karnataka (Kolar, Hutti)	Jewelry, investment

◆ 3. Non-Metallic Minerals

Mineral	State(s)	Uses
Limestone	MP, Rajasthan, Andhra Pradesh	Cement, steel
Mica	Jharkhand, Bihar, Rajasthan	Electrical industry (heat resistance)
Gypsum	Rajasthan, Tamil Nadu	Fertilizer, cement
Rock Salt	Punjab (Mandi)	Cooking salt

◆ 4. Energy Resources

◆ A. Conventional Sources

Type	Major States	Usage
Coal	Jharkhand (Jharia), Chhattisgarh, Odisha	Thermal power, industry
Petroleum	Mumbai High (offshore), Assam, Gujarat	Fuel, industry, plastic
Natural Gas	Krishna-Godavari Basin, Tripura	Cleaner than coal, industry
Uranium	Jharkhand (Jaduguda), Andhra Pradesh	Nuclear power

◆ B. Non-Conventional (Renewable) Sources

Source	Leading Areas	Remarks
Solar Energy	Rajasthan, Gujarat, Madhya Pradesh	Solar parks, rooftop panels
Wind Energy	Tamil Nadu, Gujarat, Maharashtra	Coastal regions; wind farms
Hydropower	Uttarakhand, HP, Sikkim	Generated by flowing water (dams)

Source	Leading Areas	Remarks
Biogas	Rural India (cattle waste)	Clean cooking energy
Tidal & Geo-Thermal	Gulf of Kutch, Ladakh	Experimental stages in India

◆ 5. Distribution Summary – PYQ Focus Table

Mineral	Top Producing State	India Rank in World
Iron Ore	Odisha	4th
Bauxite	Odisha	5th
Manganese	Maharashtra	5th
Mica	Jharkhand + Bihar belt	1st
Coal	Jharkhand	5th largest reserve
Petroleum	Offshore (Mumbai High)	~80% from offshore

◆ 6. Mineral Conservation Steps

- Use substitutes (e.g., plastic or composites)

- Recycle metals
- Efficient mining technology
- Use renewable energy sources

◆ 7. SSC CGL PYQ HIGHLIGHTS

- **Jharkhand** → Leading in **coal, mica, uranium**
- **Odisha** → Top state in **iron ore, bauxite**
- **Rajasthan** → **Zinc, lead, limestone, gypsum**
- **Mumbai High** → Major **offshore oilfield**
- **Solar energy** → Best in **Rajasthan & Gujarat**
- **Wind energy** → Highest in **Tamil Nadu**

INDUSTRIES IN INDIA

◆ 1. Types of Industries

Type	Based On	Examples
Raw Material	Agro / Mineral	Cotton (agro), Iron & Steel (mineral)
Size	Large / Small / Cottage	Tata Steel (large), Handloom (cottage)
Ownership	Public / Private / Joint / Cooperative	HAL (public), Reliance (private), AMUL (cooperative)

◆ 2. Major Industries of India

A. Textile Industry (Largest Employer)

Type	Location	Features
Cotton	Gujarat, Maharashtra, Punjab	Oldest industry; large export
Woolen	Punjab, Ludhiana, Delhi	Uses sheep wool, winter clothing
Silk	Karnataka, West Bengal, Assam	India = 2nd largest silk producer
Jute	West Bengal, Bihar	Eco-friendly; declining demand

B. Iron and Steel Industry (Basic Industry)

- **Key Centers:** Jamshedpur, Bhilai, Bokaro, Durgapur, Rourkela
- **Inputs:** Iron ore, coal, limestone
- **Public Sector Units:** SAIL (Steel Authority of India Ltd.)

C. Petroleum Refining Industry

Location	Key Refineries
Maharashtra	Mumbai Refinery
Gujarat	Jamnagar (Reliance – World's largest)
Assam	Digboi (Oldest refinery in India – 1901)
Tamil Nadu	Manali (Chennai)

E. Chemical & Fertilizer Industry

State	Notable Products
Gujarat	Dyes, petrochemicals, salt
Tamil Nadu	Fertilizers (Neyveli), industrial chemicals
UP & Punjab	Urea, ammonium sulfate

D. Engineering & Automobile Industry

City	Specialization
Pune, Chennai	Automobiles
Bengaluru, Hyderabad	Aerospace, IT hardware
Jamshedpur	Heavy machinery (Tata Motors)

◆ 3. Industrial Regions of India

Region	Major Cities
Mumbai-Pune Belt	Mumbai, Pune, Nashik
Hugli Industrial Belt	Kolkata, Howrah, Haldia

Region	Major Cities
Bangalore-Tamil Nadu Region	Bengaluru, Chennai, Coimbatore
Chhotanagpur Plateau Region	Jamshedpur, Bokaro, Durgapur
Delhi-Meerut Region	Delhi, Ghaziabad, Faridabad

◆ 4. Problems Faced by Indian Industries

- Power shortage
- Poor infrastructure & transport
- Delayed clearances & bureaucracy
- Environmental pollution
- Global competition

◆ 5. Environmental Impact of Industries

Issue	Impact
Air pollution	From smoke, gas emissions

Issue	Impact
Water pollution	From industrial waste
Land degradation	Waste dumping, mining
Noise pollution	Machinery, transport systems

◆ 6. SSC CGL PYQ HIGHLIGHTS

- **Jamshedpur** = Iron & steel hub
- **West Bengal** = Jute industry leader
- **Jam Nagar (Gujarat)** = World's largest oil refinery
- **Digboi (Assam)** = First oil refinery in India (1901)
- **SAIL** = Major public sector steel company
- **IT industry** = Bengaluru, Hyderabad (called **Silicon Valley of India**)
- **Silk production** = Karnataka is No. 1
- **Coir industry** = Kerala

IMPORTANT PASSES, LAKES & STRAITS

◆ 1. Important Mountain Passes in India

Pass	State/UT	Connects / Remarks
Nathu La	Sikkim	India-China border; reopened for trade

Pass	State/UT	Connects / Remarks
Jelep La	Sikkim	India-Tibet; used in 1962 war
Shipki La	Himachal Pradesh	India-China trade route

Pass	State/UT	Connects / Remarks
Lipulekh	Uttarakhand	Used for Kailash Mansarovar Yatra
Mana Pass	Uttarakhand	Highest motorable road; connects to Tibet
Khardung La	Ladakh	One of world's highest motorable roads
Zoji La	Jammu & Kashmir	Connects Srinagar–Leh
Banihal Pass	Jammu & Kashmir	Connects Jammu with Srinagar (used by Jawahar Tunnel)
Baralacha La	Himachal Pradesh	Manali–Leh highway
Rohtang Pass	Himachal Pradesh	Kullu–Lahaul region; famous tourist spot
Chang La	Ladakh	On route to Pangong Lake
Bomdi La	Arunachal Pradesh	Connects Tawang with Assam
Dihang Pass	Arunachal Pradesh	India–China border

🧠 **Nathu La, Lipulekh, Shipki La** are trade routes with **China**.

♦ 2. Important Lakes in India

✓ Natural Lakes

Lake	Location	Type	Notable Fact
Wular Lake	Jammu & Kashmir	Freshwater (tectonic)	Largest freshwater lake in India
Dal Lake	Jammu & Kashmir	Freshwater	Houseboats and tourism
Chilika Lake	Odisha	Brackish water lagoon	Largest coastal lagoon in India
Pulicat Lake	Andhra Pradesh – TN	Brackish water	2nd largest lagoon in India
Sambhar Lake	Rajasthan	Saltwater	Largest inland salt lake
Loktak Lake	Manipur	Freshwater	Phumdis (floating islands)
Tso Moriri	Ladakh	Freshwater (High Alt.)	Ramsar site
Pangong Lake	Ladakh	Saltwater	Shared by India & China
Sasthamkotta	Kerala	Freshwater	Largest freshwater lake in Kerala
Kolleru Lake	Andhra Pradesh	Freshwater	Bird sanctuary

✓ **Man-made Lakes**
(Dams/Reservoirs)

Lake	State	Formed by
Govind Sagar	Himachal Pradesh	Bhakra Dam
Rana Pratap Sagar	Rajasthan	Rana Pratap Sagar Dam
Nagarjuna Sagar	Andhra Pradesh/Telangana	Nagarjuna Sagar Dam
Krishna Raja Sagar	Karnataka	KRS Dam
Hussain Sagar	Telangana (Hyderabad)	Built in 1562

◆ **3. Important Straits of the World**

Strait	Connects	Between
Palk Strait	Bay of Bengal & Gulf of Mannar	India & Sri Lanka
Strait of Gibraltar	Atlantic Ocean & Mediterranean Sea	Europe (Spain) & Africa (Morocco)
Strait of Hormuz	Persian Gulf & Gulf of Oman	Iran & Oman
Strait of Malacca	Indian Ocean & South China Sea	Malaysia & Indonesia
Bering Strait	Bering Sea & Chukchi Sea	Russia & Alaska (USA)

Strait	Connects	Between
Sunda Strait	Java Sea & Indian Ocean	Java & Sumatra (Indonesia)
Bosporus Strait	Black Sea & Sea of Marmara	Separates Asian & European Turkey
Dardanelles Strait	Aegean Sea & Sea of Marmara	Also in Turkey
Torres Strait	Coral Sea & Arafura Sea	Australia & Papua New Guinea
Cook Strait	Tasman Sea & South Pacific Ocean	North & South Islands of New Zealand

◆ **SSC CGL PYQ HIGHLIGHTS**

- **Wular Lake** = Largest freshwater lake
- **Sambhar Lake** = Largest inland salt lake
- **Palk Strait** = India & Sri Lanka
- **Gulf of Mannar Biosphere** = Between India & Sri Lanka
- **Rohtang Pass** = Connects Kullu & Lahaul
- **Nathu La & Lipulekh** = India-China trade points
- **Chilika Lake** = Odisha, migratory birds, brackish water
- **Dal Lake** = Houseboats and tourism hub
- **Strait of Gibraltar** = Joins Atlantic and Mediterranean

PORTS & DAMS IN INDIA

◆ 1. Major Ports of India

India has **13 major ports**: 12 government-owned + 1 private (Ennore/Kamarajar).

Port	State/UT	Coast	Specialty / Note
Mumbai	Maharashtra	West (Arabian Sea)	Largest natural port
Jawaharlal Nehru Port (Nhava Sheva)	Maharashtra	West	Largest container port
Kandla (Deendayal Port)	Gujarat	West	Tidal port; near Gulf of Kutch
Mormugao	Goa	West	Iron ore export
New Mangalore	Karnataka	West	Fertilizers, iron exports
Kochi (Cochin)	Kerala	West	Natural harbor, shipbuilding, tourism
Paradip	Odisha	East (Bay of Bengal)	Handles coal & iron ore
Visakhapatnam	Andhra Pradesh	East	Deepest landlocked port

Port	State/UT	Coast	Specialty / Note
Chennai	Tamil Nadu	East	Artificial port
Ennore (Kamarajar)	Tamil Nadu	East	First private major port
Tuticorin (V.O. Chidambaram)	Tamil Nadu	East	Pearl fishing, trade with Sri Lanka
Haldia	West Bengal	East	Serves Kolkata; oil & cargo
Kolkata Port	West Bengal (Hooghly River)	East	Inland riverine port, oldest port

🧠 **Mumbai & Kolkata = Natural ports**

🧠 **Chennai = Artificial port**

◆ 2. Minor Ports (Notified by States)

Port	State
Dahej, Hazira, Mundra	Gujarat
Dighi, Dharamtar	Maharashtra
Gangavaram, Krishnapatnam	Andhra Pradesh
Pipavav	Gujarat

✓ **Mundra Port (Gujarat)** is India's largest private port.

◆ 3. Important Dams in India

Dam	River	State	Purpose
Bhakra Nangal	Sutlej	Himachal Pradesh	Hydro + Irrigation ; tallest dam
Tehri Dam	Bhagirathi	Uttarakhand	Highest dam in India (260.5 m)
Sardar Sarovar	Narmada	Gujarat (multi-state)	Irrigation + Hydropower
Hirakud Dam	Mahandi	Odisha	Longest dam in India (~26 km)
Nagarjuna Sagar	Krishna	Telangana/Andhra	3rd largest dam in India
Krishna Raja Sagar	Cauvery	Karnataka	Built by Visvesvaraya
Mettur Dam	Cauvery	Tamil Nadu	Oldest functioning dam
Tungabhadra Dam	Tungabhadra	Karnataka	Multipurpose project
Idukki Dam	Periyar	Kerala	Arch dam;

Dam	River	State	Purpose
			Hydropower
Rihand Dam	Rihand (Tributary of Son)	UP/MP	Largest manmade reservoir (Govind Ballabh Pant Sagar)

◆ 4. Major River-Valley Projects

Project	River	State(s)
Bhakra-Nangal	Sutlej	HP, Punjab, Haryana
Damodar Valley (DVC)	Damodar	Jharkhand, West Bengal
Narmada Project	Narmada	Gujarat, MP, Maharashtra
Mahi Bajaj Sagar	Mahi	Rajasthan
Rajasthan Canal (Indira Gandhi Canal)	Sutlej-Beas-Rajasthan	Longest canal in India

◆ 5. SSC CGL PYQ HIGHLIGHTS

- **Mumbai** = Natural port
- **Chennai** = Artificial port
- **Kandla** = Tidal port
- **Visakhapatnam** = Deepest port
- **Kolkata** = Riverine port
- **Haldia** = Serves Kolkata

- **Tehri Dam** = Highest dam
- **Hirakud Dam** = Longest dam
- **Bhakra Dam** = on **Sutlej**
- **Sardar Sarovar** = on **Narmada**
- **Idukki Dam** = Arch dam in Kerala

- **Krishna Raja Sagar** = built by **M. Visvesvaraya**

TIME ZONES, LONGITUDES, LATITUDES, & TROPIC OF CANCER

◆ 1. Tropic of Cancer (23½° N)

Feature	Details
Latitude	23°30' N (23.5° North)
Role	Divides India into Tropical (South) and Subtropical (North) zones
Significance	Northernmost limit where sun's rays fall vertically (on June 21 – Summer Solstice)
Continents It Crosses	South America, Africa, Asia (India)

◆ Tropic of Cancer – 8 Indian States It Passes Through (West to East)

State	Districts / Landmarks
Gujarat	Near J Tropic Museum, Amreli
Rajasthan	Near southern Udaipur
Madhya Pradesh	Ratlam, Shivpuri
Chhattisgarh	Korba, Surajpur
Jharkhand	Ranchi, Kanke region

State	Districts / Landmarks
West Bengal	Krishnanagar, Nadia
Tripura	Udaipur town
Mizoram	Southern region

🧠 **Mnemonic: GRaMPa Chasing Jungle Wildlife Through Mountains**

(Gujarat, Rajasthan, MP, Chhattisgarh, Jharkhand, West Bengal, Tripura, Mizoram)

◆ 2. Indian Standard Time (IST)

Feature	Details
Standard Meridian	82.5° E Longitude
Passes Through	Mirzapur , near Allahabad (Uttar Pradesh)
IST Time Zone	UTC +5 hours 30 minutes
Used Across	Entire India (single time zone)
Time Difference with GMT	82.5 × 4 = 330 mins = 5.5 hrs ahead

🧠 For every 1° = 4 minutes difference in time

◆ 3. India's Latitudinal & Longitudinal Extent

Extent Type	Coordinates	Location
Latitude (N-S)	8°4' N to 37°6' N	Kanyakumari (TN) to Indira Col (Ladakh)
Longitude (E-W)	68°7' E to 97°25' E	Gujarat to Arunachal Pradesh
N-S Length	~ 3,214 km	
E-W Width	~ 2,933 km	

🧠 Despite wide longitudinal spread, India follows a **single time zone (IST)**

◆ 4. Key Map-Based Points for SSC CGL

Point	Description
Northernmost point	Indira Col (Ladakh)
Southernmost point	Indira Point (Nicobar Islands)
Southernmost mainland point	Kanyakumari (Tamil Nadu)

Point	Description
-------	-------------

Westernmost point Guhar Moti (Kutch, Gujarat)

Easternmost point Kibithu (Arunachal Pradesh)

◆ 5. SSC CGL PYQ HIGHLIGHTS

- **IST is based on** → 82.5° E longitude
- **Time difference between IST and GMT** → +5 hours 30 minutes
- **Tropic of Cancer** divides India into **two climate zones**
- **Tropic of Cancer** passes through **8 Indian states**
- **India's latitudinal extent** → affects **climate variation**
- **India's longitudinal extent** → causes **time difference** between east and west (~2 hours)

TRANSPORT & COMMUNICATION IN INDIA

◆ 1. Modes of Transport in India

Type	Includes	Key Points
Land	Roads, Railways	Backbone of internal movement
Water	Inland waterways, Sea transport	Cheapest for bulky goods

Type	Includes	Key Points
Air	Domestic & International flights	Fastest but costliest
Pipeline	Crude oil, natural gas, slurry pipelines	Energy-efficient, low maintenance

◆ 2. Road Transport

✓ National Highways

Feature	Details
Managed by	NHAI (National Highways Authority of India)
Share in road length	~2% of total roads but carry 40% traffic
Golden Quadrilateral	Connects Delhi, Mumbai, Chennai, Kolkata
Total NH length	1.46 lakh km+ (as of 2024)

✓ Key National Highways (NH)

NH Name	Route
NH-44	Srinagar to Kanyakumari (Longest NH)
NH-27	Porbandar (Gujarat) to Silchar (Assam)
NH-16	Kolkata to Chennai (east coast)
NH-48	Delhi to Chennai via Mumbai & Bengaluru

- 💡 **Golden Quadrilateral** = 4 metro cities
- 💡 **North-South Corridor** = Srinagar to Kanyakumari
- 💡 **East-West Corridor** = Silchar to Porbandar

◆ 3. Rail Transport

Feature	Details
Managed by	Indian Railways (4th largest network)
Total route length	~68,000 km
Divided into	18 Railway Zones
First railway line	1853 – Mumbai to Thane
Fastest train	Vande Bharat Express
Electrification	Over 85% by 2024

💡 **Konkan Railway** runs along **West Coast (Mumbai to Mangalore)**

💡 **Metro rail** introduced first in **Kolkata (1984)**

◆ 4. Water Transport

✓ Inland Waterways

Waterway	Route
National Waterway 1	Allahabad to Haldia (Ganga River)
National Waterway 2	Sadiya to Dhubri (Brahmaputra River)
National Waterway 3	Kollam to Kottapuram (Kerala backwaters)

💡 Waterways are **cheapest** but **slowest** mode of transport.

◆ 5. Air Transport

Managed by	Airport Authority of India (AAI)
Oldest Airport	Juhu (Mumbai)
First International Airport	Thiruvananthapuram (Kerala)
Major International Airports	Delhi (IGI), Mumbai (Chhatrapati Shivaji), Kolkata, Chennai, Bengaluru
UDAN Scheme	Boosts regional connectivity

💡 **Air India** = National carrier

💡 Fastest for **emergency & remote access**

◆ 6. Pipelines in India

Pipeline	Route	Transports
HBJ Pipeline	Hazira–Vijaipur–Jagdishpur	Natural gas
Mumbai–Manmad–Manglya	Maharashtra–MP	Petroleum
Jamnagar–Loni	Gujarat to UP	LPG

✅ Pipelines are used for **petroleum, gas, and slurry**. Low maintenance, economical.

◆ 7. Communication in India

Type	Examples
Personal	Postal, telephone, mobile
Mass Communication	TV, radio, internet, newspaper
Satellites	INSAT, GSAT, NAVIC

💡 India's postal network = **largest in the world**

💡 **Doordarshan** = public broadcaster

💡 **Digital India** = boosts e-governance & internet access

◆ 8. SSC CGL PYQ Highlights

- **Longest National Highway** = NH-44 (Srinagar–Kanyakumari)
- **First Train** = Mumbai to Thane (1853)
- **Cheapest transport** = Waterways
- **Fastest transport** = Airways
- **Golden Quadrilateral** = Connects 4 metro cities
- **Konkan Railway** = Along West Coast
- **National Waterway-1** = Ganga river route
- **Pipeline transport** = Least affected by weather

CHEMISTRY

Digital ID: 2130056

1.STATES OF MATTER

State	Shape	Volume	Compressibility	Flow	Example
Solid	Fixed	Fixed	Negligible	No	Ice, Iron, Stone
Liquid	No fixed shape	Fixed	Slightly	Yes	Water, Oil, Milk
Gas	No fixed shape	No fixed volume	Highly	Yes	Air, Oxygen, Carbon Dioxide
Plasma	No fixed shape	No fixed volume	Highly	Yes	Sun, Stars, Neon Signs
Bose-Einstein Condensate (BEC)	Very low energy	Fixed shape	Very low	No	Supercooled atoms (below 0 K)

◆ Interconversion of States of Matter

Process	Change
Melting	Solid → Liquid (Heat absorbed)
Freezing	Liquid → Solid (Heat released)
Vaporization	Liquid → Gas (Heat absorbed)
Condensation	Gas → Liquid (Heat released)
Sublimation	Solid ↔ Gas (directly)
Deposition	Gas → Solid (directly)
Ionization	Gas → Plasma
De-ionization	Plasma → Gas

◆ Important Terms

- **Boiling Point:** Temp. at which liquid → gas (e.g., Water: 100°C)
- **Melting Point:** Temp. at which solid → liquid (e.g., Ice: 0°C)
- **Evaporation:** Slow surface-level vaporization below boiling point
- **Latent Heat:**

○ **Fusion** – Heat required to convert solid to liquid

○ **Vaporization** – Heat required to convert liquid to gas

◆ Factors Affecting Evaporation

1. Surface area ↑ → Evaporation ↑

2. Temperature $\uparrow$ $\rightarrow$ Evaporation $\uparrow$
3. Humidity $\uparrow$ $\rightarrow$ Evaporation $\downarrow$
4. Wind speed $\uparrow$ $\rightarrow$ Evaporation $\uparrow$

SSC PYQs Highlights

- “Which state of matter is most compressible?” $\rightarrow$ **Gas**
- Q often seen)

- “Sun and stars are made of?” $\rightarrow$ **Plasma**
- “Latent heat of fusion refers to?” $\rightarrow$ **Solid to liquid conversion**
- “Which factor does not affect evaporation?” $\rightarrow$ (Trick

Theories on Matter – Summary Table

Theory Name	What It Tells About	Proposed By
Particle Theory of Matter	Matter is made up of tiny particles with spaces between them and they are constantly moving.	Ancient Indian & Greek philosophers (concept), later refined by modern science
Kinetic Theory of Matter	Particles of matter are always in motion; motion increases with temperature.	Developed by Maxwell, Boltzmann, etc.
Brownian Motion	Particles suspended in fluid show random zig-zag motion, proving that matter particles move.	Robert Brown
Diffusion Theory	Particles move from high to low concentration and mix on their own due to motion.	Based on Kinetic Theory
Latent Heat Theory	During change of state, matter absorbs/releases energy without change in temperature.	Joseph Black (concept of latent heat)

2.ATOMIC STRUCTURE & ELEMENTS

◆ What is an **Atom**?

- **Definition:** Smallest unit of matter that retains the identity of the element.
- Coined by: **John Dalton**

◆ Subatomic Particles

- Atom consists of **three subatomic particles**:
 - **Electron (-)**
 - **Proton (+)**
 - **Neutron (0)**

Particle	Charge	Mass (approx.)	Discovered By
Electron	-1	1/1836 of proton	J.J. Thomson (1897)
Proton	+1	1 a.m.u. (approx.)	E. Goldstein (1886)
Neutron	0	1 a.m.u. (approx.)	James Chadwick (1932)

♦ Atomic Models

Scientist	Model Name	Main Idea
Dalton	Dalton's Atomic Theory	Atom is indivisible, spherical, and fundamental unit of matter
J.J. Thomson	Plum Pudding Model	Atom is a positively charged sphere with electrons embedded like raisins
Rutherford	Nuclear Model	Atom has a small, dense, positively charged nucleus, electrons revolve around it
Bohr	Planetary Model	Electrons revolve in fixed orbits/shells with specific energy levels
Chadwick	Neutron Discovery	Neutron is a neutral particle inside the nucleus along with protons

♦ Bohr's Model – Key Points

- Electrons revolve in **fixed energy levels** called **shells (K, L, M, N)**.
- Energy is absorbed or emitted when electrons **jump between levels**.
- Maximum electrons in a shell **$= 2n^2$**

♦ Atomic Number (Z) & Mass Number (A)

- Atomic Number (Z)** = Number of **protons**
- Mass Number (A)** = Protons + **Neutrons**

- Isotopes:** Same atomic number, different mass number (e.g., Hydrogen: ^1H , ^2H , ^3H)
- Isobars:** Same mass number, different atomic number (e.g., ^{40}Ca and ^{40}Ar)

♦ Valency & Octet Rule

- Valency:** Combining capacity of an atom; depends on **electrons in outermost shell**.
- Octet Rule:** Atoms tend to complete **8 electrons in outer shell** to become stable.

♦ Element, Compound, Mixture

Type	Definition	Example
Element	Pure substance with same kind of atoms	Hydrogen, Gold
Compound	Substance formed by chemical combo of elements	H ₂ O, CO ₂
Mixture	Physically combined substances	Air, Salt water

🧠 SSC PYQ Highlights:

- “Electron discovered by?” → **J.J. Thomson**
- “Neutron discovered by?” → **James Chadwick**
- “Atom is mostly empty space” – proved by? → **Rutherford’s Experiment**
- “What is the mass number of an atom?” → Sum of **protons + neutrons**
- “Number of protons = number of ____?” → **Electrons** (in neutral atom)

3.ACIDS, BASES & SALTS

Acids

- Substances that release **H⁺ ions** in aqueous solution.
- **Sour** in taste.
- Turn **blue litmus red**.
- pH value **less than 7**.

Types of Acids

Type	Examples
Strong Acids	HCl (Hydrochloric), H ₂ SO ₄ (Sulfuric)
Weak Acids	CH ₃ COOH (Acetic), Citric acid
Organic Acids	Lactic, Tartaric, Citric
Mineral Acids	Nitric acid, Sulfuric acid

Bases

- Substances that release **OH⁻ ions** in solution.
- **Bitter** in taste, **soapy** to touch.
- Turn **red litmus blue**.
- pH value **greater than 7**.

Types of Bases

Type	Examples
Strong Bases	NaOH (Sodium hydroxide), KOH
Weak Bases	NH ₄ OH (Ammonium hydroxide)
Alkali	Water-soluble bases (e.g., NaOH)

Salts

- Formed when **acid reacts with base** (neutralization).
- Can be **neutral, acidic, or basic salts**.
- pH depends on **acid–base strength**.

Common Salts and Their Uses

Salt	Formula	Use
Sodium chloride	NaCl	Table salt
Sodium bicarbonate	NaHCO ₃	Baking soda
Sodium carbonate	Na ₂ CO ₃	Washing soda
Calcium carbonate	CaCO ₃	Marble, chalk
Potassium nitrate	KNO ₃	Fertilizers, fireworks
Plaster of Paris (POP)	CaSO ₄ ·½H ₂ O	Construction, medical bandage
Bleaching powder	CaOCl ₂	Disinfectant, bleaching agent

Indicators

- Substances that change color in acid/base.

Indicator	In Acid	In Base
Litmus	Red	Blue
Methyl Orange	Red	Yellow
Phenolphthalein	Colorless	Pink
Turmeric	Yellow	Reddish-brown

pH Scale (0 to 14)

- < 7 → Acidic
- = 7 → Neutral
- > 7 → Basic

pH of:

- Stomach acid: ~1–2**
- Water: 7**
- Toothpaste: 8–9**
- Soap: 9–10**

SSC PYQ Highlights

- Litmus color change → **Acid: Blue to Red**
- Common name of NaHCO₃ → **Baking soda**
- POP chemical formula → **CaSO₄·½H₂O**
- pH of neutral solution → 7
- Acid in curd → **Lactic acid**
- Ant sting acid → **Formic acid**

4.METALS & NON-METALS

◆ Definition

- **Metals:** Elements that readily lose electrons to form positive ions (cations).
- **Non-metals:** Elements that gain or share electrons to form negative ions (anions) or covalent bonds.

◆ Physical Properties Comparison

Property	Metals	Non-Metals
Appearance	Lustrous (shiny)	Dull (except iodine)
Hardness	Hard (except sodium, potassium)	Soft (except diamond)
Malleability	Malleable (drawn into sheets)	Non-malleable
Ductility	Ductile (drawn into wires)	Non-ductile
Conduction	Good conductors of heat & electricity	Poor conductors (except graphite)
Sonority	Sonorous (produce sound)	Non-sonorous
Melting Point	High	Low (generally)
State at Room Temp	Mostly solids	Solid/gas (except bromine – liquid)

◆ Chemical Properties Comparison

Property	Metals	Non-Metals
Reaction with Oxygen	Forms basic oxides (e.g., Na_2O , MgO)	Forms acidic oxides (e.g., SO_2 , CO_2)
Reaction with Water	Some react (e.g., Na, K)	No reaction
Reaction with Acids	Produce hydrogen gas	No reaction
Reaction with Bases	Usually no reaction	Some form salts (e.g., $\text{Cl}_2 + \text{NaOH}$)

Examples

Metals	Non-Metals
Iron, Copper, Gold, Silver	Oxygen, Nitrogen, Sulphur
Aluminium, Zinc, Sodium	Carbon, Phosphorus, Chlorine

♦ Important Exceptions

- **Mercury:** Only liquid metal at room temperature
- **Iodine:** Non-metal but lustrous
- **Graphite:** Non-metal but good conductor
- **Diamond:** Non-metal but hardest natural substance
- **Sodium/Potassium:** Metals but soft and can be cut with a knife
- with acid → **Hydrogen**

♦ Metalloids (Semi-Metals)

- Show properties of both metals and non-metals
- Examples: **Boron (B), Silicon (Si), Arsenic (As), Antimony (Sb)**

🧠 Common SSC PYQ Facts

- Metal used in thermometer → **Mercury**
- Good conductor non-metal → **Graphite**
- Hardest known substance → **Diamond**
- Reacts vigorously with water → **Sodium/Potassium**
- Gas produced when metal reacts

Important Ores & Minerals

Metal/Mineral	Ore Name	Chemical Formula	Type
Iron (Fe)	Hematite	Fe_2O_3	Oxide
Aluminium (Al)	Bauxite	$\text{Al}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$	Oxide
Copper (Cu)	Chalcopyrite	CuFeS_2	Sulphide
Zinc (Zn)	Zinc Blende (Sphalerite)	ZnS	Sulphide
Lead (Pb)	Galena	PbS	Sulphide
Tin (Sn)	Cassiterite	SnO_2	Oxide
Silver (Ag)	Argentite	Ag_2S	Sulphide
Manganese (Mn)	Pyrolusite	MnO_2	Oxide
Magnesium (Mg)	Magnesite	MgCO_3	Carbonate
Mercury (Hg)	Cinnabar	HgS	Sulphide

5. CHEMICAL REACTIONS & EQUATIONS

◆ What is a Chemical Reaction?

- A **chemical reaction** is a process where **new substances** are formed with **new properties**.
- Example:
 $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$ (Hydrogen and oxygen react to form water)

◆ Characteristics of Chemical Reactions

- Change in state**
- Change in color**
- Evolution of gas**
- Change in temperature**
(exothermic or endothermic)
- Formation of precipitate**

◆ Types of Chemical Reactions

Type	Description	Example
Combination	Two or more reactants form a single product	$\text{C} + \text{O}_2 \rightarrow \text{CO}_2$
Decomposition	One reactant breaks into two or more products	$2\text{H}_2\text{O} \rightarrow 2\text{H}_2 + \text{O}_2$
Displacement	A more reactive element replaces a less reactive one	$\text{Zn} + \text{CuSO}_4 \rightarrow \text{ZnSO}_4 + \text{Cu}$
Double Displacement	Ions are exchanged between two compounds	$\text{Na}_2\text{SO}_4 + \text{BaCl}_2 \rightarrow \text{BaSO}_4 + 2\text{NaCl}$
Oxidation-Reduction (Redox)	One substance is oxidized, the other is reduced	$\text{Fe}_2\text{O}_3 + 3\text{CO} \rightarrow 2\text{Fe} + 3\text{CO}_2$
Neutralization	Acid reacts with base to form salt and water	$\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
Precipitation	Insoluble solid (precipitate) forms	$\text{AgNO}_3 + \text{NaCl} \rightarrow \text{AgCl} \downarrow + \text{NaNO}_3$

Important Terms

- Oxidation:** Addition of oxygen / loss of electrons
- Reduction:** Loss of oxygen / gain of electrons

- Redox Reaction:** Both oxidation and reduction occur simultaneously
- Precipitate:** Insoluble solid formed during a reaction

◆ Chemical Equation Format

- **Word Equation:**
Hydrogen + Oxygen → Water
- **Balanced Chemical Equation:**
 $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$

Always balance equations to follow the Law of Conservation of Mass.

◆ Balancing Equations (SSC Tip)

- Total atoms on **reactants side** = **products side**
- Example:
 $\text{Fe} + \text{O}_2 \rightarrow \text{Fe}_2\text{O}_3$
Balanced: $4\text{Fe} + 3\text{O}_2 \rightarrow 2\text{Fe}_2\text{O}_3$

🧠 SSC PYQ Highlights

- Which reaction gives a precipitate?
→ **Double displacement**
- Redox reaction example? → **Zn + CuSO₄ → ZnSO₄ + Cu**
- Reaction between acid and base → **Neutralization**

6.PERIODIC TABLE & PROPERTIES

◆ What is the Periodic Table?

- A tabular arrangement of **chemical elements** based on **atomic number**, electronic configuration, and recurring chemical properties.
- **Modern Periodic Law:** "Properties of elements are a periodic function of their atomic numbers."
→ Proposed by **Henry Moseley** (1913)

◆ Structure of Modern Periodic Table

Feature	Details
Total Elements	118
Periods	7 horizontal rows
Groups	18 vertical columns
First Element	Hydrogen (H)

Feature	Details
Last Element	Oganesson (Og)

◆ Classification of Elements

Category	Details
Metals	Left & center of table (e.g., Na, Fe)
Non-Metals	Upper right (e.g., O, N, Cl)
Metalloids	Diagonal line (B, Si, As, Sb)
Noble Gases	Group 18 (He, Ne, Ar, etc.) – inert gases
Transition Metals	Group 3 to 12

◆ **Periodic Trends (Across Periods & Down Groups)**

Property	Across Period (→)	Down Group (↓)
Atomic Size	Decreases	Increases
Ionization Energy	Increases	Decreases
Electronegativity	Increases	Decreases
Metallic Character	Decreases	Increases
Non-Metallic Character	Increases	Decreases

◆ **Important Groups & Names**

Group	Name	Examples
Group 1	Alkali Metals	Li, Na, K
Group 2	Alkaline Earth Metals	Mg, Ca, Ba
Group 17	Halogens	F, Cl, Br, I
Group 18	Noble Gases (Inert Gases)	He, Ne, Ar, Kr, Xe

◆ **Key Terms**

- **Valency:** Combining capacity of an element
- **Atomic Number (Z):** Number of protons
- **Mass Number (A):** Protons + Neutrons
- **Isotopes:** Same atomic number, different mass number
- **Isobars:** Same mass number, different atomic numbers

🧠 **SSC PYQ Highlights**

- Who gave Modern Periodic Law? → **Henry Moseley**
- Total groups in periodic table? → **18**
- Atomic size increases in which direction? → **Down a group**
- Group of inert gases? → **Group 18**
- First element in periodic table? → **Hydrogen**

7.CARBON AND ITS COMPOUNDS

♦ Why Carbon is Special

- Atomic number: 6
- Valency: **4 (tetraivalent)** – forms **4 covalent bonds**
- Can form **long chains (catenation)** and **rings**
- Basis of **organic chemistry**

Bond Type	Example	Bond Info
Covalent bond	Most carbon compounds	Shared electrons, no ions involved

♦ Types of Carbon Compounds

Type	Examples
Alkanes	Methane (CH ₄), Ethane (C ₂ H ₆)
Alkenes	Ethene (C ₂ H ₄), Propene (C ₃ H ₆)
Alkynes	Ethyne (C ₂ H ₂), Propyne (C ₃ H ₄)
Aromatic	Benzene (C ₆ H ₆)
Alcohols	Ethanol (C ₂ H ₅ OH)
Acids	Acetic Acid (CH ₃ COOH)

♦ Allotropes of Carbon

Allotrope	Form	Properties
Diamond	Crystalline	Hardest natural substance , non-conductor
Graphite	Crystalline	Good conductor , soft, used in pencils
Fullerene	Molecular (C₆₀)	Football-shaped molecule
Coal, Charcoal	Amorphous	Used as fuel

♦ Types of Bonding in Carbon Compounds

Bond Type	Example	Bond Info
Single bond	Alkanes	Saturated compounds (C–C)
Double bond	Alkenes	Unsaturated (C=C)
Triple bond	Alkynes	Unsaturated (C≡C)

♦ Important Compounds

Compound	Use
Methane (CH₄)	Biogas
Ethanol (C₂H₅OH)	Alcoholic beverages, sanitizer
Acetic acid (Vinegar)	Food industry
Benzene	Solvent in chemical industry
Baking soda	Cooking, cleaning agent

◆ Properties of Carbon Compounds

- **Low melting/boiling points**
- **Poor conductors** of electricity (except graphite)
- Undergo **combustion**
- Form **isomers** (same formula, different structure)

- Hardest natural substance? → **Diamond**

- Good conductor among non-metals? → **Graphite**

- What is CH_3COOH ? → **Acetic Acid**

- Molecular formula of benzene? → **C_6H_6**

- Alcohol in wine? → **Ethanol** ($\text{C}_2\text{H}_5\text{OH}$)

🧠 SSC PYQ Highlights

Functional Groups in Organic Chemistry

Functional Group	Formula	Prefix/Suffix	Example
Alcohol	-OH	Prefix: <i>hydroxy-</i> Suffix: <i>-ol</i>	Ethanol ($\text{C}_2\text{H}_5\text{OH}$)
Aldehyde	-CHO	Suffix: <i>-al</i>	Ethanal (CH_3CHO)
Ketone	-CO-	Suffix: <i>-one</i>	Propanone (CH_3COCH_3)
Carboxylic Acid	-COOH	Suffix: <i>-oic acid</i>	Acetic acid (CH_3COOH)
Ester	-COOR	Suffix: <i>-oate</i>	Methyl ethanoate
Ether	-O-	Suffix: <i>ether</i>	Diethyl ether
Amine	-NH ₂	Suffix: <i>-amine</i>	Methylamine (CH_3NH_2)
Amide	-CONH ₂	Suffix: <i>-amide</i>	Ethanamide (CH_3CONH_2)
Halide	-X (F, Cl, Br, I)	Prefix: <i>halo-</i>	Chloromethane (CH_3Cl)
Alkene	$\text{C}=\text{C}$ (double bond)	Suffix: <i>-ene</i>	Ethene (C_2H_4)
Alkyne	$\text{C}\equiv\text{C}$ (triple bond)	Suffix: <i>-yne</i>	Ethyne (C_2H_2)

🧠 Quick SSC Exam Tip:

- “-OH group belongs to?” → **Alcohol**
- “Acetic acid belongs to which group?” → **Carboxylic Acid**
- “C=O group in the middle of chain?” → **Ketone**

Common Chemicals & Their Uses – SSC Notes

Chemical Name	Formula	Common Use(s)
Sodium Chloride	NaCl	Table salt, food preservative
Sodium Bicarbonate	NaHCO ₃	Baking soda – cooking, cleaning, antacid
Sodium Carbonate	Na ₂ CO ₃	Washing soda – laundry, softening water
Calcium Carbonate	CaCO ₃	Chalk, limestone, marble – construction, blackboard chalk
Calcium Oxide	CaO	Quicklime – cement, neutralizing acidic soil
Calcium Hydroxide	Ca(OH) ₂	Slaked lime – whitewashing
Calcium Sulphate (POP)	CaSO ₄ ·½H ₂ O	Plaster of Paris – molds, bandages
Bleaching Powder	CaOCl ₂	Disinfectant, bleaching agent
Hydrochloric Acid	HCl	Cleaning toilets, digestion (stomach acid)
Sulphuric Acid	H ₂ SO ₄	Batteries, fertilizers, industrial processes
Nitric Acid	HNO ₃	Fertilizers, explosives
Acetic Acid	CH ₃ COOH	Vinegar – food preservation
Ethanol	C ₂ H ₅ OH	Alcoholic drinks, sanitizer, fuel
Methane	CH ₄	Biogas – cooking, fuel
Ammonia	NH ₃	Fertilizers, cleaning products
Hydrogen Peroxide	H ₂ O ₂	Antiseptic, bleaching hair and clothes
Carbon Dioxide	CO ₂	Carbonated drinks, fire extinguishers
Magnesium Hydroxide	Mg(OH) ₂	Milk of magnesia – antacid
Zinc Oxide	ZnO	Sunscreen, antiseptic creams

SSC PYQ Highlights:

- Bleaching powder formula → **CaOCl₂**
- POP formula → **CaSO₄·½H₂O**
- Milk of magnesia use → **Antacid**
- Acid in vinegar → **Acetic acid**
- Washing soda formula → **Na₂CO₃**

8.ALLOYS – COMPOSITION & USES

Alloy Name	Constituents	Uses
Brass	Copper + Zinc	Musical instruments, plumbing fittings
Bronze	Copper + Tin	Statues, medals, coins
Steel	Iron + Carbon	Construction, machinery
Stainless Steel	Iron + Chromium + Nickel	Kitchen utensils, surgical instruments
Solder	Lead + Tin	Joining electrical wires
German Silver	Copper + Zinc + Nickel	Utensils, decorative items
Duralumin	Aluminium + Copper + Manganese + Magnesium	Aircraft parts
Nichrome	Nickel + Chromium	Heating elements (e.g., toasters)
Magnalium	Aluminium + Magnesium	Aircrafts, instruments
Pewter	Tin + Copper + Antimony	Decorative items

CHEMISTRY IN EVERYDAY LIFE

Soaps and Detergents

Type	Details
Soaps	Made from fatty acids + alkali (NaOH/KOH)
Detergents	Synthetic; work in hard water too

- Soaps: Work poorly in hard water
- Detergents: Good cleansing agents even in hard water

2. Medicines & Drugs

Category	Function	Examples
Analgesics	Pain relievers	Aspirin, Paracetamol
Antibiotics	Kill bacterial infections	Penicillin, Tetracycline
Antiseptics	Prevent infection on wounds	Dettol, Savlon
Antacids	Neutralize stomach acid	Milk of magnesia, Gelusil
Tranquilizers	Reduce anxiety/depression	Diazepam, Alprazolam
Antipyretics	Reduce fever	Paracetamol

3. Dyes & Colors

- Used in **textiles, food, inks**
- Natural and synthetic types
- Example: Indigo dye (from plant), Methylene blue (synthetic)

4. Cosmetics & Personal Care

- **Shampoo:** Contains surfactants
- **Toothpaste:** Mild abrasives (calcium carbonate), fluoride
- **Perfumes/Deodorants:** Alcohol-based, contain aromatic compounds

5. Food Preservatives & Additives

Type	Example
Preservative	Sodium benzoate, vinegar
Sweetener	Saccharin, Aspartame
Flavor enhancer	MSG (Ajinomoto)
Coloring agent	Tartrazine, caramel

6. Chemistry in Household Items

Item	Chemical Used	Use
Baking Powder	Sodium bicarbonate	Baking, cooking
Bleach	Sodium hypochlorite	Disinfecting
Glass Cleaner	Ammonia solution	Cleaning glass
Toilet cleaner	Hydrochloric acid	Removing stains
Matchstick head	Phosphorus	Ignition

SSC PYQ Highlights:

- Drug that reduces pain → **Analgesic**
- Substance used in soap → **Sodium salt of fatty acid**
- Milk of magnesia used as → **Antacid**
- Ajinomoto is → **Monosodium glutamate (MSG)**
- Detergents work in → **Hard water**

PHYSICS

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UNITS, DIMENSIONS & MEASUREMENTS

◆ 1. Physical Quantity

- A quantity that can be measured and has units
- Examples: Length, Time, Mass, Speed, Pressure

◆ 2. Types of Physical Quantities

Type	Examples
Fundamental	Length, Mass, Time, Temperature
Derived	Speed, Force, Pressure, Work

◆ 3. Systems of Units

System	Used In	Example
CGS	Centimeter-Gram-Second	Speed in cm/s
MKS	Meter-Kilogram-Second	Force in $\text{kg}\cdot\text{m}/\text{s}^2$
SI	Standard worldwide	Speed in m/s

✓ SSC exams focus mainly on SI Units.

◆ 15 Physical Quantities with SI Base Units

S.No.	Physical Quantity	SI Unit	Symbol
1	Length	meter	m
2	Mass	kilogram	kg

S.No.	Physical Quantity	SI Unit	Symbol
3	Time	second	s
4	Electric Current	ampere	A
5	Temperature	kelvin	K
6	Luminous Intensity	candela	cd
7	Amount of Substance	mole	mol
8	Plane Angle	radian	rad
9	Solid Angle	steradian	sr
10	Frequency	hertz	Hz
11	Force	newton	N ($\text{kg}\cdot\text{m}/\text{s}^2$)
12	Pressure	pascal	Pa (N/m^2)
13	Energy / Work / Heat	joule	J ($\text{N}\cdot\text{m}$)
14	Power	watt	W (J/s)
15	Electric Charge	coulomb	C ($\text{A}\cdot\text{s}$)

◆ 5. Derived Units Examples

Quantity	Unit	SI Unit Expression
Area	square meter	m^2
Volume	cubic meter	m^3
Speed	meter/second	m/s
Acceleration	m/s^2	m/s^2
Force	Newton	$N = kg \cdot m/s^2$
Pressure	Pascal	$Pa = N/m^2$
Energy	Joule	$J = N \cdot m$
Power	Watt	$W = J/s$

◆ 6. Accuracy vs Precision

Term	Meaning
Accuracy	Closeness to actual value
Precision	Closeness of repeated results

◆ 7. Least Count

- Smallest measurable value on an instrument
- Ordinary scale: 1 mm

- Vernier caliper: 0.1 mm
- Screw gauge: 0.01 mm

◆ 8. Significant Figures

- All meaningful digits in a measurement
- Used to show precision

◆ 9. Common Measuring Instruments

Instrument	Measures
Vernier Caliper	Small lengths
Screw Gauge	Wire thickness
Stopwatch	Time
Thermometer	Temperature
Scale/Ruler	Length

◆ 10. SSC CGL PYQ Highlights

- SI unit of Force = Newton (N)
- SI unit of Energy = Joule (J)
- SI unit of Power = Watt (W)
- SI unit of Pressure = Pascal (Pa)
- $1 N = 1 kg \cdot m/s^2$
- Least count of meter scale = 1 mm

LAWS OF MOTION & FORCE

Force – Basics

- **Force:** A push or pull acting on an object
- **SI Unit: Newton (N)**
- **Types:**
 - **Contact Force** (e.g., friction, muscular force)
 - **Non-contact Force** (e.g., gravitational, magnetic, electrostatic)

Newton's Three Laws of Motion

Law	Explanation	Example
1st Law (Law of Inertia)	A body remains at rest or in uniform motion unless acted upon by an external force	A book on a table stays at rest
2nd Law	Force = mass × acceleration ($F = ma$)	More force needed to push heavier box
3rd Law	For every action, there is an equal and opposite reaction	Balloon moves backward when air escapes

Inertia

- **Inertia:** Resistance of an object to change its state of motion
- Types:
 - **Inertia of Rest**
 - **Inertia of Motion**
 - **Inertia of Direction**

Friction

- **Friction:** Force that opposes motion
- Types:
 - **Static friction**
 - **Kinetic friction**
 - **Rolling friction**
- Applications:
 - Walking, writing, brakes
- Friction can be **reduced** using lubricants or ball bearings

Important Formulas

Concept	Formula	Unit
Force	$F = m \times a$	Newton (N)
Momentum	$p = m \times v$	kg·m/s
Impulse	Impulse = Force × Time	N·s
Newton (1 N)	$1 \text{ N} = 1 \text{ kg} \times 1 \text{ m/s}^2$	—

🧠 SSC PYQ Highlights

- Newton's 2nd law gives → **Quantitative definition of force**
- Unit of force → **Newton**
- Friction is a → **Contact force**
- Example of action-reaction pair → **Gun recoil when bullet is fired**

WORK, POWER, AND ENERGY

Work

- **Definition:** Work is said to be done when a force is applied and there is **displacement** in the direction of the force.
- **Formula:**
 $\text{Work (W)} = \text{Force (F)} \times \text{Displacement (d)} \times \cos(\theta)$
- **SI Unit: Joule (J)**
- **1 Joule = 1 Newton × 1 meter**
- **Positive Work:** Force and displacement in same direction
- **Negative Work:** Force and displacement in opposite direction
- **Zero Work:** Displacement is zero or perpendicular to force

Energy

- **Definition:** Capacity to do work
- **SI Unit: Joule (J)**
- **Types of Energy:**
 - **Kinetic Energy (KE):** Energy due to motion
 $\text{KE} = \frac{1}{2} mv^2$
 - **Potential Energy (PE):**
Energy due to position
 $\text{PE} = mgh$
 - **Other Types:** Heat, Chemical, Electrical, Solar, Nuclear

Power

- **Definition:** Rate of doing work
- **Formula:**
 $\text{Power} = \text{Work} / \text{Time}$
- **SI Unit: Watt (W)**
- **1 Watt = 1 Joule / 1 second**
- **Larger Units:**
 - 1 Kilowatt (kW) = 1000 W
 - 1 Horsepower (hp) = 746 W

Commercial Unit of Energy

- **Kilowatt-hour (kWh)** = Energy consumed by a 1000 W device in 1 hour
- **1 kWh = 3.6×10^6 J**
- Used in electricity bills

Conservation of Energy

- **Energy can neither be created nor destroyed**, it only changes form.
- Example: In a pendulum – PE ↔ KE

SSC PYQ Highlights

- Unit of work? → **Joule**
- KE of a moving object depends on → **Mass and speed**
- What is 1 HP? → **746 W**
- Unit used in electricity bills? → **kWh**
- Work is zero when → **No displacement**

LIGHT – REFLECTION, REFRACTION & LENSES

1. Reflection of Light

- **Reflection:** Bouncing back of light from a surface
- **Laws of Reflection:**
 1. Angle of incidence = Angle of reflection
 2. Incident ray, reflected ray, and normal lie in the same plane
- **Types:**
 - **Regular Reflection:** From smooth surface (e.g. mirror)
 - **Diffuse Reflection:** From rough surface

◆ Plane Mirror Properties:

- Image is **virtual, erect, laterally inverted, and same size**
- Used in **periscopes, dressing mirrors**

2. Spherical Mirrors

Mirror Type	Description	Use
Concave	Curved inward	Torches, shaving mirrors
Convex	Curved outward	Vehicle rear-view mirrors

- **Concave** mirrors can form **real/inverted** or **virtual/erect** images depending on object position
- **Convex** always gives **virtual, erect, and diminished** image

3. Refraction of Light

- **Refraction:** Bending of light when it passes from one medium to another (due to change in speed)
- **Laws of Refraction:**
 1. Incident ray, refracted ray, and normal lie in the same plane
 2. **Snell's Law:** when light passes from one material to another, it changes direction, and the amount it bends depends on the materials' refractive indices

◆ Effects of Refraction:

- Pencil in water appears bent
- Bottom of a pool appears raised
- Sun visible before actual sunrise and after sunset

4. Lenses

Lens Type	Description	Use
Convex	Converging lens (thicker in middle)	Magnifying glass, camera lens
Concave	Diverging lens (thinner in middle)	Spectacles for myopia

- **Convex** lens can form real or virtual image
- **Concave** lens always forms **virtual, erect, diminished** image

5. Optical Instruments (Basic)

Instrument	Concept Used
Microscope	Convex lenses
Telescope	Reflection + Lenses

Instrument	Concept Used
Human Eye	Convex lens system
Camera	Convex lens & shutter

Eye Defects Comparison Table

Defect	Issue	Cause	Image Forms	Correction Lens
Myopia	Distant objects appear blurry	Eyeball too long or lens too curved	In front of retina	Concave lens (-)
Hypermetropia	Near objects appear blurry	Eyeball too short or lens too flat	Behind retina	Convex lens (+)
Presbyopia	Both near & far vision affected	Aging – lens loses flexibility	Varies	Bifocal lens
Astigmatism	Blurred/Distorted vision	Irregular curvature of cornea/lens	Uneven focus on retina	Cylindrical lens

SSC PYQ Highlights

- Mirror used in vehicles → **Convex mirror**
- Image in plane mirror → **Virtual and laterally inverted**
- Lens used for magnification → **Convex lens**
- Refraction occurs due to → **Change in speed of light**
- Concave lens corrects → **Myopia (short-sightedness)**

SOUND

Basics of Sound

- Sound is a mechanical wave that requires a medium.
- Produced by vibrations of objects.
- Travels as a longitudinal wave through compressions and rarefactions.

2. Speed of Sound

Medium	Speed (m/s)
Air (25°C)	343
Water	1482
Iron	5130

Order: Solids > Liquids > Gases

Increases with: temperature, humidity, elasticity

3. Reflection of Sound

- Law of Reflection: Angle of incidence = Angle of reflection
- Used in:
 - Megaphones
 - Soundboards
 - Stethoscopes
 - Auditoriums

1. Types of Waves

Feature	Longitudinal Wave	Transverse Wave
Direction	Vibration ↔ Wave direction	Vibration ↓ Wave direction
Example	Sound in air	Light, water waves
Particles move as	Compressions & Rarefactions	Crests & Troughs
Medium required?	Yes	Not always

Sound travels as longitudinal waves in air, solids, liquids.

2. Characteristics of Sound Waves

Term	Description
Wavelength (λ)	Distance between two compressions or rarefactions
Frequency (f)	Number of vibrations per second (in Hz)
Time Period (T)	Time taken for one vibration
Amplitude (A)	Maximum displacement of particles
Speed (v)	Distance travelled by wave in 1 sec

Formulae:

- $v = f \times \lambda$
- $f = 1 / T$

◆ 3. Infrasonic & Ultrasonic Waves

Type	Frequency Range	Sources
Infrasonic	< 20 Hz	Earthquakes, elephants
Audible	20 Hz – 20,000 Hz	Humans
Ultrasonic	> 20,000 Hz	Bats, SONAR, dogs

◆ 4. Echo

- Echo is the reflection of sound heard after a delay.
- Min. distance = 17.2 meters**
- Time delay** ≥ 0.1 sec for human ears to distinguish it.

✦ Formula:

- Distance = (Speed × Time) / 2

◆ 5. Reflection of Sound

- Laws of Reflection:**
 - Angle of incidence = Angle of reflection
 - Incident ray, reflected ray, and normal lie in same plane
- Applications:
 - Megaphone, stethoscope, soundboards

◆ 6. SONAR (Sound Navigation And Ranging)

Feature Detail

Type of Wave Ultrasonic

Use Measure depth of sea, detect objects underwater

Formula Depth = (Speed × Time) / 2

Example: A ship sends a sound wave that returns in 2 seconds.

If speed = 1500 m/s → Depth = (1500 × 2) / 2 = 1500 m

◆ 7. Reverberation

- Prolonged sound due to multiple reflections.**
- Can be reduced by:
 - Curtains, false ceiling, carpets, acoustic panels

◆ 8. Human Ear – Hearing Mechanism

Part	Function
Pinna	Collects sound
Ear Canal	Directs sound
Eardrum	Vibrates
Middle Ear	3 bones amplify vibrations
Inner Ear (Cochlea)	Converts to electrical signals
Auditory Nerve	Sends to brain

◆ 9. Properties of Sound

Property	Depends On
Loudness	Amplitude (A)
Pitch	Frequency (f)
Quality	Waveform or shape

HEAT AND TEMPERATURE

◆ 1. Heat

- **Definition:** Form of **energy** transferred from a **hot body** to a **cold body**.

• SI Unit: **Joule (J)**

• CGS Unit: **Calorie (cal)**

○ **1 cal = 4.18 J**

Heat flows from higher temperature to lower temperature until equilibrium.

◆ 2. Temperature

- **Definition:** Degree of hotness or coldness of a body.

• SI Unit: **Kelvin (K)**

• Other units: **Celsius (°C), Fahrenheit (°F)**

✦ Does **not** depend on quantity of matter.
It is a measure of **average kinetic energy** of particles.

◆ 3. Difference between Heat and Temperature

Feature	Heat	Temperature
Nature	Form of energy	Measure of hotness
SI Unit	Joule (J)	Kelvin (K)
Depends on	Mass, material, temp diff.	Avg. kinetic energy of particles
Transfer	Yes (flows hot → cold)	No (only measurable)
Measured by	Calorimeter	Thermometer

◆ 4. Measurement Instruments

- **Thermometer** – Measures **temperature**
- **Calorimeter** – Measures **heat** exchanged

◆ 5. Scales of Temperature

Scale	Freezing Pt.	Boiling Pt.	Relation
Celsius (°C)	0°C	100°C	
Fahrenheit (°F)	32°F	212°F	$^{\circ}\text{F} = (9/5 \times ^{\circ}\text{C}) + 32$
Kelvin (K)	273 K	373 K	$\text{K} = ^{\circ}\text{C} + 273$

◆ 6. Heat Transfer Methods

Method	Description	Medium Required
Conduction	Heat transfer by contact	Solids only
Convection	Heat transfer by movement of fluid	Liquids, gases
Radiation	Heat transfer without medium	No medium needed

✦ **Sun → Earth** heat transfer = **Radiation**

◆ 7. Specific Heat Capacity

- **Definition:** Amount of heat required to raise the temperature of 1 kg of substance by 1°C (or 1 K)
- Symbol: **c**
- Unit: **J/kg·K**

- Formula:
 $Q = mc\Delta T$
 Where:
 - Q = heat supplied (J)
 - m = mass (kg)
 - c = specific heat (J/kg·K)
 - ΔT = change in temperature

◆ 8. Change of State

- When a substance changes its state (solid $\leftrightarrow$ liquid $\leftrightarrow$ gas), **temperature remains constant** during phase change.
- **Latent Heat:** Heat required to change the state without changing temperature.

Type Symbol Unit

Latent heat of fusion L_f J/kg

Latent heat of vapor. L_v J/kg

◆ 9. Applications in Daily Life

- Sea breeze and land breeze (due to convection)
- Cooking in metal utensils (good conductors)
- Thermos flask (prevents conduction, convection, radiation)
- Woolen clothes trap air (bad conductor $\rightarrow$ keeps warm)

◆ 10. SSC PYQ Points

- Heat is a form of **energy**, temperature is **not**.
- Metals are **good conductors**, water and air are **poor conductors**.
- Specific heat of water is **high** – used in cooling systems.
- **Black surfaces** absorb and radiate more heat.

GRAVITATION

◆ Newton's Law of Gravitation

- Every object attracts every other object.
- **G (Gravitational constant)** = $6.674 \times 10^{-11} \text{ Nm}^2/\text{kg}^2$

◆ Acceleration due to Gravity (g)

- Value on Earth: **9.8 m/s^2**
- **$g = GM/R^2$**
- **g on Moon = 1/6 of Earth**

◆ Mass vs Weight

Mass	Weight
Quantity of matter	Force of gravity
Unit: kg	Unit: Newton (N)
Constant	Varies with gravity
Measured by balance	Measured by spring balance

Formula: $W = m \times g$

◆ Free Fall

- Falling under gravity alone
- **Equations of motion** apply with $a = g$

◆ Thrust & Pressure

- **Thrust:** Force normal to surface
- **Pressure = Thrust / Area**
- **Unit:** Pascal (Pa)

Pressure increases with **depth** in liquids

◆ Archimedes' Principle

- Upward force (buoyancy) = **weight of fluid displaced**

- Basis for floating, submarines, hydrometers

◆ Density

- **Density = mass/volume**
- No unit for relative density

◆ Key SSC Points

- Gravity is **always attractive**
- G is **universal constant**
- Weight is **zero in free fall**
- Pressure in liquid = **$h\rho g$**
- **Lighter on Moon** due to lower gravity

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ELECTRICITY & CIRCUITS

◆ 1. Electric Current

- Flow of **electrons** (negative charges)
- SI Unit: **Ampere (A)**
- $1\text{ A} = 1\text{ Coulomb/second}$

◆ 2. Electric Potential & Potential Difference

- **Electric Potential:** Work done to bring 1C charge
- **Potential Difference (V):**
- Unit: **Volt (V)**
- Measured by: **Voltmeter** (connected in parallel)

◆ 3. Ohm's Law

"Current is directly proportional to voltage across a conductor at constant temperature."

$$V = I \cdot R$$

- V = voltage
- I = current
- R = resistance
- SI Unit of resistance = **Ohm (Ω)**

◆ 4. Resistance

- Opposes flow of current
- Depends on:

○ Length $\uparrow \rightarrow R \uparrow$

○ Area $\uparrow \rightarrow R \downarrow$

○ Material (copper < nichrome)

Resistor: Device used to provide resistance.

◆ 5. Series and Parallel Circuits

Feature	Series	Parallel
Current	Same in all devices	Divides among branches
Voltage	Divides	Same across all branches

◆ 6. Power and Energy

- Electric Power (P):

$$P = V \cdot I$$

- Unit: **Watt (W)**

- 1 kilowatt (kW) = 1000 W

- Unit: kilowatt-hour (kWh)

◆ 7. Heating Effect of Current (Joule's Law)

More current or resistance $\rightarrow$ more heat

Used in: **Electric heaters, iron, fuse, bulb**

◆ 8. Magnetic Effect of Current

- **Current-carrying conductor** produces **magnetic field**

- Discovered by **Hans Christian Oersted**

◆ 9. Right-Hand Thumb Rule

Thumb = current direction

Curled fingers = magnetic field direction (circular around wire)

◆ 10. Fleming's Left-Hand Rule (Motor Rule)

Used for: **Electric motors**

- **Thumb** $\rightarrow$ Force
- **First finger** $\rightarrow$ Magnetic Field
- **Middle finger** $\rightarrow$ Current

Helps find the **direction of motion** of a current-carrying conductor in a magnetic field.

◆ 11. Fleming's Right-Hand Rule (Generator Rule)

Used for: **Electric generators**

- **Thumb** $\rightarrow$ Motion
- **First finger** $\rightarrow$ Magnetic field
- **Middle finger** $\rightarrow$ Current (induced)

Tells direction of **induced current** when a conductor moves in a magnetic field.

◆ 12. MCQ-Important Facts for SSC

- Ohm's law: $V = IR$
- Electric power: $P = VI$
- Fuse: Safety device (melts on excess current)
- Magnetic field around a straight wire = **circular**
- Fleming's rules used in:
 - Left-hand: **Motor**
 - Right-hand: **Generator**

BIOLOGY

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CELL: STRUCTURE & FUNCTIONS

◆ 1. What is a Cell?

- **Basic structural and functional unit** of life
- Discovered by **Robert Hooke** in **1665** (in cork)
- **Cell Theory:** Proposed by **Schleiden and Schwann**
 - All living organisms are made of cells
 - Cells arise from pre-existing cells (added by **Virchow**)

◆ 2. Types of Organisms

Type	Description	Example
Unicellular	Single-celled organisms	Amoeba, Paramecium
Multicellular	Made of many cells	Humans, Plants

◆ 3. Cell Types

Type	Characteristics
Prokaryotic	No nucleus, simple structure
Eukaryotic	Nucleus present , complex structure

- ✓ Prokaryotes: Bacteria
- ✓ Eukaryotes: Plants, Animals

◆ 4. Cell Shape & Size

- Varies with function
- **Smallest cell: Mycoplasma**
- Largest cell: **Ostrich egg**

◆ 5. Parts of a Cell

Part	Function
Cell membrane	Controls entry/exit of substances
Cytoplasm	Jelly-like fluid ; site for reactions
Nucleus	Controls cell activities, contains DNA
Cell wall	(Plants only) Gives shape & support
Vacuole	Storage (large in plants)
Plastids	Only in plants (e.g., chloroplasts)
Mitochondria	Powerhouse of cell (makes energy)
Ribosomes	Protein synthesis
Endoplasmic Reticulum (ER)	Transport (Rough ER has ribosomes)
Golgi Apparatus	Packages and transports substances

◆ 6. Differences: Plant Cell vs Animal Cell

Feature	Plant Cell	Animal Cell
Cell Wall	Present	Absent

Feature	Plant Cell	Animal Cell
Vacuole	Large and central	Small or absent
Plastids	Present (e.g., chloroplasts)	Absent
Shape	Fixed (rectangular)	Irregular/round

◆ 7. Functions of Cell Organelles

Organelle	Function
Nucleus	Controls all cell activities
Mitochondria	Produces energy (ATP)
Ribosomes	Make proteins
ER	Transports materials
Golgi body	Modifies, packs & delivers
Vacuoles	Store food, water, waste
Lysosomes	Digests waste (suicide bags)
Chloroplasts	Photosynthesis (only in plants)

◆ 8. SSC PYQ Highlights

- **Robert Hooke** discovered the cell
- Mitochondria: **Powerhouse**
- Nucleus: **Control center**
- Plant cells have **cell wall + chloroplasts**
- Ribosomes make **proteins**

CELL ORGANELLES – ELABORATED

◆ 1. Nucleus

- **Control center** of the cell.
- Contains:
 - **Nuclear membrane** (double-layered)
 - **Nucleoplasm** (fluid)
 - **Nucleolus** (makes ribosomes)
 - **Chromatin** (DNA + proteins → condenses to chromosomes during division)
- **Functions:**
 - Regulates cell activities
 - Controls **growth and reproduction**
 - Carries **genetic information** (DNA)

Present in **eukaryotic cells** only

Absent in **prokaryotes** (they have nucleoid)

◆ 2. Mitochondria

- Known as the "**Powerhouse of the Cell**"
- Produces energy in the form of **ATP (Adenosine Triphosphate)**
- Has a **double membrane**:
 - Outer smooth
 - Inner folded into **cristae** (increases surface area)
- Contains its own **DNA** → can replicate

Present in both **plant & animal cells**

◆ 3. Endoplasmic Reticulum (ER)

- Network of membrane-bound channels in cytoplasm
- Two types:

Type	Features	Function
Rough ER (RER)	Has ribosomes on surface	Protein synthesis & transport
Smooth ER (SER)	No ribosomes	Lipid synthesis, detoxification

Acts as **transport system** of the cell
Both plant & animal cells

◆ 4. Ribosomes

- **Protein factories** of the cell
- Found:
 - Freely in cytoplasm
 - Attached to Rough ER
- **No membrane** (non-membranous organelle)

Found in **all cells**, including **prokaryotes**

◆ 5. Golgi Apparatus (Golgi Body)

- Stack of **flattened sacs** (cisternae)
- **Functions:**
 - Modifies, packages, and transports proteins & lipids
 - Forms **lysosomes**
 - Helps in secretion

Present in **eukaryotic cells**

◆ 6. Lysosomes

- Known as **"suicide bags"**
- Contains **digestive enzymes** (hydrolytic)
- Break down:

- Worn-out organelles
- Food particles
- Invading bacteria/viruses

- Help in **cell self-destruction (autolysis)**

Found mainly in **animal cells**

◆ 7. Vacuoles

- **Fluid-filled sacs for storage**
- Stores: water, food, waste, pigments

In Plants	In Animals
Large & central	Small or absent

- Surrounded by membrane called **tonoplast**

Larger in **plant cells**

◆ 8. Chloroplasts

- Site of **photosynthesis**
- Contains green pigment **chlorophyll**
- Has **double membrane** and its own **DNA**
- Converts sunlight → chemical energy (glucose)

Found **only in plant cells**

◆ 9. Cell Membrane (Plasma Membrane)

- **Outer covering** of animal cell; inner to cell wall in plant cell
- **Semi-permeable:** controls movement of substances
- Made of **lipid bilayer + proteins**

Present in **all cells**

◆ 10. Cell Wall

- Found only in **plant cells** (and fungi, bacteria)
- Made of **cellulose** in plants
- **Rigid, outer covering**
- Provides:
 - Shape
 - Protection
 - Prevents excessive water intake

Present in **plant cells only**

◆ 11. Plastids

- Only in **plant cells**
- Types:

Type	Function	Example
Chloroplast	Photosynthesis (green)	Leaves
Chromoplast	Color to fruits & flowers	Carrot, tomato
Leucoplast	Store starch, fats, oils	Roots, seeds

HUMAN BODY SYSTEMS

◆ 1. Digestive System

Converts food into simpler substances for absorption and energy.

Major Organs & Functions

Organ	Function
Mouth	Chewing + salivary digestion (starch → sugar via salivary amylase)
Esophagus	Food pipe , carries food to stomach by peristalsis
Stomach	Protein digestion starts here using pepsin , acidifies food (HCl)
Small Intestine	Digestion completes; absorbs nutrients via villi
Liver	Produces bile (breaks fats into droplets – emulsification)
Pancreas	Produces enzymes (amylase, lipase, trypsin)
Large Intestine	Absorbs water, forms feces

Key Enzymes

- **Amylase**: Carbohydrates
- **Lipase**: Fats
- **Pepsin**: Proteins (in stomach)
- **Trypsin**: Proteins (in intestine)

◆ 2. Respiratory System

Exchange of gases (O₂ in, CO₂ out)

Major Organs & Functions

Organ	Function
Nose/Nasal cavity	Filters air
Pharynx	Common food/air passage
Larynx	Voice box
Trachea	Windpipe, carries air
Bronchi & Bronchioles	Branch into lungs
Lungs (Alveoli)	Site of gas exchange (via diffusion)

Respiration Types

Type	Description
Aerobic	Uses O ₂ , gives CO ₂ + energy
Anaerobic	No O ₂ , forms lactic acid or alcohol

◆ 3. Circulatory System

Transports nutrients, gases, hormones, and waste throughout the body.

Main Components

Part	Function
Heart	Pumps blood
Arteries	Carry blood away from heart (oxygenated except pulmonary artery)

Part	Function
Veins	Carry blood to the heart (deoxygenated except pulmonary vein)
Capillaries	Exchange materials between blood and tissues
Blood	Carries O ₂ (RBC), fights infection (WBC), clotting (Platelets)

Heart Structure

- 4 chambers: **2 atria + 2 ventricles**
- Right side: Deoxygenated blood
- Left side: Oxygenated blood
- **Valves** prevent backflow

Blood Components

Component	Function
RBC (Red Blood Cells)	Carry oxygen (via hemoglobin)
WBC (White Blood Cells)	Fight infection
Platelets	Help in blood clotting
Plasma	Liquid medium, transports nutrients & hormones

◆ 4. SSC CGL PYQ HIGHLIGHTS

- **Pepsin** digests protein in stomach
- **Bile** breaks down fats but has no enzymes
- **Alveoli** are the site of gas exchange
- **Arteries = thick, no valves; Veins = thin, with valves**
- **RBC = no nucleus, WBC = has nucleus**

HUMAN NERVOUS & EXCRETORY SYSTEMS

◆ 1. Human Nervous System

Coordinates and controls body activities through **electrical signals (nerve impulses)**.

Main Parts

Component	Function
Brain	Control center
Spinal Cord	Connects brain to body, reflex actions
Nerves	Carry signals to/from brain & spinal cord

Divisions of Nervous System

System	Sub-Parts	Function
Central Nervous System (CNS)	Brain + Spinal Cord	Controls all body functions
Peripheral Nervous System (PNS)	Cranial & Spinal Nerves	Connects CNS to body parts
Autonomic Nervous System (ANS)	Sympathetic & Parasympathetic	Involuntary actions (e.g., heartbeat, digestion)

Brain Structure

Part	Function
Cerebrum	Intelligence, memory, voluntary actions
Cerebellum	Balance and coordination
Medulla (Brainstem)	Controls involuntary actions (heartbeat, breathing)

Brain is protected by:

- **Skull** (bone)
- **Meninges** (membranes)

- **Cerebrospinal fluid** (shock absorber)

Reflex Action

- **Automatic and quick response** to stimuli
- **Controlled by spinal cord** (not brain)
- Example: withdrawing hand from hot object

◆ 2. Human Excretory System

Removes **metabolic waste** (mainly **urea**, water, salts) from body.

Main Organs

Organ	Function
Kidneys	Filter blood to form urine
Ureters	Carry urine from kidneys to bladder
Urinary Bladder	Stores urine
Urethra	Passes urine out of body

Structure of Kidney

- Functional unit: **Nephron**
- Each nephron filters blood to produce urine.

Nephron Functions:

- Filtration** (in glomerulus)
- Reabsorption** (in tubules)

3. Secretion → Urine formation

Urine = 95% water + 2.5% urea + salts

Other Excretory Organs

Organ	Waste Removed
Lungs	CO ₂ , water vapor
Skin	Sweat (water + salts + urea)
Liver	Breaks down toxins, excess amino acids

◆ 3. SSC CGL PYQ HIGHLIGHTS

- Cerebrum** is largest part of brain
- Reflex** = controlled by **spinal cord**
- Nephron** is kidney's structural & functional unit
- Urine passes: Kidney → Ureter → Bladder → Urethra
- Lungs** excrete carbon dioxide
- Urea** is the main nitrogenous waste

NUTRITION, HEALTH & DISEASES

Types of Nutrition

Type	Description	Example
Autotrophic	Make own food (photosynthesis)	Plants
Heterotrophic	Depend on others for food	Animals, Fungi

Modes of Heterotrophic Nutrition

Mode	Description	Example
Saprotrophic	Feeding on dead organic matter	Fungi
Parasitic	Live on/in host and harm it	Plasmodium, lice
Holozoic	Ingest, digest, absorb	Humans, dogs

◆ 2. Nutrition in Humans

Main Steps: Ingestion → Digestion → Absorption → Assimilation → Egestion

- Digestion starts in **mouth (salivary amylase)**
- **Stomach:** Protein digestion (pepsin + HCl)
- **Small intestine:** All digestion completed; **nutrient absorption**
- **Liver:** **Secretes bile** (for fat digestion)
- **Pancreas:** **Secretes enzymes** (amylase, lipase, trypsin)

◆ 3. Photosynthesis in Plants

Process by which green plants make food using sunlight, CO₂, and water.

◆ 4. Health

State of physical, mental, and social well-being, not just absence of disease.

◆ 5. Disease

Disturbance in normal functioning of the body

Types of Diseases

Type	Example	Duration
Acute	Cold, fever	Short-term
Chronic	Tuberculosis, diabetes	Long-term
Infectious	Malaria, flu	Spread from person to person

Type	Example	Duration
Non-infectious	Cancer, diabetes	Not spread

◆ 6. Pathogens (Disease-causing organisms)

Pathogen Type	Examples	Disease
Bacteria	Mycobacterium	Tuberculosis
Virus	HIV, Influenza	AIDS, Flu
Protozoa	Plasmodium	Malaria
Fungi	Microsporum	Ringworm
Worms	Tapeworm, Roundworm	Ascariasis

◆ 7. Means of Disease Transmission

- Air (e.g., TB)
- Water (e.g., cholera)
- Vectors (e.g., mosquitoes → malaria, dengue)
- Contact (e.g., ringworm)
- Sexual contact (e.g., HIV)

◆ 8. Immunity

- **Body's defense system** against pathogens
- **Vaccination** helps develop immunity

◆ 9. Prevention & Control

- Public hygiene
- Clean drinking water
- Vaccination (e.g., BCG for TB, Polio drops)

◆ 10. SSC CGL PYQ HIGHLIGHTS

- Malaria → Caused by **Plasmodium** (protozoa), spread by **female Anopheles mosquito**
- TB → Caused by **bacteria**
- AIDS → Caused by **HIV (virus)**

- Cholera → Spread through **contaminated water**
- BCG vaccine → For **tuberculosis**
- Ringworm → Fungal infection
- Protein deficiency → **Kwashiorkor**
- Vitamin A deficiency → **Night blindness**

REPRODUCTION IN HUMANS & PLANTS

◆ 1. What is Reproduction?

Process by which organisms produce offspring of their own kind.

◆ 2. Types of Reproduction

Type	Characteristics	Example
Asexual	Involves single parent , no gametes	Amoeba, Hydra
Sexual	Involves 2 parents + gametes	Humans, Plants

◆ 3. Asexual Reproduction in Plants

Method	Description	Example
Binary Fission	Parent divides into 2 equal halves	Amoeba
Budding	Small bud grows and detaches	Hydra, Yeast
Fragmentation	Body breaks into pieces, each grows	Spirogyra
Spore Formation	Special cells (spores) form new plants	Rhizopus (fungus)
Vegetative Propagation	New plants from roots, stems, leaves	Potato (tuber), Bryophyllum (leaf), Ginger (rhizome)

◆ 4. Sexual Reproduction in Plants

Part	Function
Stamen	Male part – contains anther (pollen)
Carpel/Pistil	Female part – includes ovary (eggs), style , stigma

Key Processes:

- **Pollination:** Transfer of pollen from anther → stigma
 - **Self-pollination:** Same plant
 - **Cross-pollination:** Different plants
- **Fertilization:** Fusion of male & female gametes → zygote
- Zygote → Embryo → Seed → New plant

Female Reproductive System

Organ	Function
Ovaries	Produce ova (eggs) + estrogen/progesterone
Fallopian Tubes	Site of fertilization
Uterus	Embryo development (womb)
Vagina	Receives sperm, birth canal

◆ 6. Fertilization in Humans

- Fusion of **sperm + egg** in **fallopian tube**
- Forms **zygote** → embryo → fetus (in uterus)

◆ 5. Reproduction in Humans

Male Reproductive System

Organ	Function
Testes	Produce sperms + hormone testosterone
Scrotum	Holds testes, maintains temperature
Vas deferens	Transports sperms
Urethra	Passage for sperm + urine
Penis	Transfers sperm to female body

◆ 7. Menstrual Cycle

- Monthly cycle (~28 days) in females
- Involves egg release (ovulation), uterus lining development, and shedding if no fertilization (menstruation)

◆ 8. Contraception Methods

Type	Method & Example
Barrier	Condoms (male/female)
Hormonal	Pills
Surgical	Vasectomy (male), Tubectomy (female)
Natural	Avoiding fertile days

◆ 9. SSC CGL PYQ HIGHLIGHTS

- **Zygote** is formed by fusion of sperm & egg
- **Fertilization** in humans occurs in **fallopian tube**
- **Testes** produce sperm & testosterone

- **Menstruation** occurs if egg is **not fertilized**
- **Tubectomy & Vasectomy** = permanent contraception methods
- **Vegetative propagation** → without seeds (e.g. potato, ginger)

GENETICS & HEREDITY

◆ 1. Genetics

Branch of biology that deals with **inheritance of traits** and **variation** in organisms.

- **Father of Genetics: Gregor Johann Mendel**
- Worked on **pea plants (Pisum sativum)**

◆ 4. Mendel's Laws of Inheritance

Law 1: **Law of Dominance**

- In a pair of contrasting traits, **one (dominant)** masks the other (**recessive**) in F1 generation.
- Example: Tt (Tall × Dwarf) → All tall in F1

◆ 2. Heredity

Transmission of **characters (traits)** from **parents to offspring**.

◆ 3. Mendel's Experiments

- Conducted experiments on **pea plants** due to:
 - Clear contrasting traits (e.g., tall/dwarf)
 - Short generation time
 - Self & cross-pollination possible

Law 2: **Law of Segregation**

- **Alleles separate** during gamete formation, so each gamete gets only **one allele**.
- No blending – traits reappear in F2 generation.

Law 3: **Law of Independent Assortment**

- Alleles of different traits **assort independently** during gamete formation.
- Applicable when considering **2 traits** (dihybrid cross)

◆ 5. Important Terms

Term	Meaning
Gene	Unit of inheritance
Allele	Different forms of a gene (T/t)
Dominant	Trait that is expressed in F1 (e.g., Tall – T)
Recessive	Hidden in F1, appears in F2 when both alleles are recessive
Homozygous	Both alleles same (TT or tt)
Heterozygous	One dominant, one recessive (Tt)
Genotype	Genetic makeup (TT, Tt, tt)
Phenotype	Physical expression (Tall, Dwarf)

◆ 6. Monohybrid Cross (One Trait)

$Tt \times Tt \rightarrow$ Genotypic ratio = 1:2:1 (TT:Tt:tt)

Phenotypic ratio = 3:1 (Tall:Dwarf)

◆ 7. Dihybrid Cross (Two Traits)

Example: Round Yellow $\times$ Wrinkled Green

(RRYY $\times$ rryy)

• **F1:** All Round Yellow (RrYy)

• **F2 Phenotypic ratio = 9:3:3:1**

- 9 Round Yellow
- 3 Round Green
- 3 Wrinkled Yellow
- 1 Wrinkled Green

◆ 8. Sex Determination in Humans

• **XX = Female**

• **XY = Male**

• **Sperm decides the sex (X or Y)**

• **Egg always has X chromosome**

◆ 9. SSC CGL PYQ HIGHLIGHTS

- Mendel used **pea plant** for experiments
- Traits passed through **genes**
- **Tt** = heterozygous (hybrid)
- Phenotypic ratio in monohybrid = **3:1**
- Male determines sex of baby (XY)
- Law of Segregation $\rightarrow$ **pure line traits don't blend**

CLASSIFICATION OF LIVING ORGANISMS

◆ 1. What is Classification?

Grouping of organisms based on **similarities and differences** to make study easier and systematic.

• Introduced by **Aristotle**

- Modern classification is based on:
 - **Cell type**
(prokaryotic/eukaryotic)
 - **Number of cells**
 - **Mode of nutrition**
 - **Body organization**

◆ 2. Hierarchical Classification

(Taxonomy)

Level	Example (Human)
Kingdom	Animalia
Phylum	Chordata
Class	Mammalia
Order	Primates
Family	Hominidae
Genus	Homo
Species	sapiens

 **Mnemonic:** King Philip Came Over For Good Soup

◆ 3. Five Kingdom Classification – R.H.

Whittaker

Kingdom	Features & Examples
Monera	Prokaryotic, unicellular; bacteria
Protista	Eukaryotic, unicellular; amoeba, paramecium
Fungi	Multicellular, heterotrophic; mushrooms, yeast
Plantae	Multicellular, autotrophic; trees, grass
Animalia	Multicellular, heterotrophic; insects, humans

◆ 4. Plant Kingdom Divisions

Division	Features	Examples
Thallophyta	Simple, no roots/stems/leaves	Algae
Bryophyta	Amphibians of plant kingdom	Moss, Liverworts
Pteridophyta	Vascular tissues, no seeds	Ferns
Gymnosperms	Naked seeds	Pine, Cycas
Angiosperms	Flowering plants with covered seeds	Mango, Rose

◆ 5. Animal Kingdom – Key Groups

Group	Features	Example
Porifera	Pores, no true organs	Sponges
Coelenterata (Cnidaria)	Body cavity, stinging cells	Hydra, Jellyfish
Platyhelminthes	Flatworms, bilateral, parasites	Tapeworm
Nematoda	Roundworms, unsegmented, parasitic	Ascaris
Annelida	Segmented worms	Earthworm
Arthropoda	Jointed legs, exoskeleton	Insects, Spider
Mollusca	Soft body, hard shell	Snail, Octopus
Echinodermata	Spiny skin, marine	Starfish
Chordata	Notochord, backbone	Humans, Fish

◆ 6. Vertebrates (Subphylum Chordata)

Class	Key Features	Examples
Pisces	Gills, fins, aquatic	Fish
Amphibia	Moist skin, both land & water	Frog
Reptilia	Dry scales, cold-blooded	Snake, Lizard
Aves	Feathers, beak, lay eggs	Birds
Mammalia	Hair, mammary glands, live birth	Humans, Cow

◆ 7. SSC CGL PYQ HIGHLIGHTS

- **Whittaker** → 5 kingdom classification
- **Monera** → No nucleus (prokaryotes)
- **Fungi** → Heterotrophic & saprophytic
- **Bryophytes** → Amphibians of plant kingdom
- **Arthropoda** → Largest group of animals
- **Mammals** → Have mammary glands and hair
- **Angiosperms** → Plants with seeds inside fruits

PHOTOSYNTHESIS & PLANT PHYSIOLOGY

◆ 1. Photosynthesis

Process by which **green plants** make food using **sunlight**, **carbon dioxide**, and **water**.

◆ 2. Requirements for Photosynthesis

Requirement	Role
Sunlight	Energy source
Chlorophyll	Green pigment, absorbs sunlight
Carbon dioxide (CO ₂)	Taken in via stomata
Water (H ₂ O)	Absorbed by roots

◆ 3. Site of Photosynthesis

- **Occurs in: Chloroplasts** (contain chlorophyll)
- Mainly in **leaves**

◆ 4. Steps of Photosynthesis

1. **Light Absorption** (by chlorophyll)
2. **Water Splitting** (H₂O → H + O₂)
3. **Carbon Fixation** (CO₂ → glucose formation)
4. **Oxygen** released as by-product

◆ 5. Factors Affecting Photosynthesis

Factor	Effect
Light Intensity	Increases rate to a point

Factor	Effect
CO ₂ concentration	More CO ₂ → more food till saturation
Temperature	Too high/low slows process
Chlorophyll	More pigment → more photosynthesis

◆ 6. Stomata

- **Tiny pores on leaf surface**
- Functions:
 - **Gas exchange** (CO₂ in, O₂ out)
 - **Water loss via transpiration**

◆ 7. Transpiration

Loss of water in the form of vapor from aerial parts (mainly leaves)

Functions:

- Cools the plant
- Helps in **water & mineral transport**

◆ 8. Transportation in Plants

Water & Minerals

- Transported through **xylem** (roots → leaves)
- Movement is **unidirectional**

Food (glucose/sucrose)

- Transported by **phloem** (leaves → other parts)
- Movement is **bidirectional**

✚ **Transport process: Translocation**

◆ 9. Plant Hormones (Phytohormones)

Hormone	Function
Auxin	Cell elongation, root growth
Gibberellin	Stem elongation, seed germination
Cytokinin	Cell division
Abscisic Acid	Inhibits growth, stress response
Ethylene	Fruit ripening

◆ 10. SSC CGL PYQ HIGHLIGHTS

- **Photosynthesis** takes place in **chloroplasts**
- Oxygen is a **by-product**
- **Stomata** control gas exchange and transpiration
- **Xylem** → water transport; **Phloem** → food transport
- **Auxin** promotes growth; **Abscisic acid** inhibits it
- **Ethylene** → fruit ripening hormone
- Leaves are the **main site of photosynthesis**

MICRO-ORGANISMS & VACCINATION

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◆ 1. What are Microorganisms?

Tiny organisms that can only be seen under a microscope.

Major Types:

Type	Example	Nature
Bacteria	Lactobacillus, E. coli	Unicellular, prokaryotic
Viruses	HIV, Influenza	Not living outside host
Fungi	Yeast, Penicillium	Multicellular or unicellular
Protozoa	Amoeba, Plasmodium	Animal-like, unicellular

Type	Example	Nature
Algae	Chlamydomonas	Plant-like, mostly aquatic

◆ 2. Useful Microorganisms

Use	Example
Food industry	Yeast (makes bread, alcohol)
Medicine	Penicillium (antibiotic)
Agriculture	Rhizobium (nitrogen fixation)
Decomposition	Bacteria & fungi (recyclers)

◆ 3. Harmful Microorganisms

- Cause **diseases (pathogens)** in humans, animals, and plants.

Disease-causing Microbes:

Disease	Pathogen Type	Example
Tuberculosis	Bacteria	Mycobacterium
AIDS	Virus	HIV
Malaria	Protozoa	Plasmodium
Ringworm	Fungi	Microsporium
Influenza	Virus	Influenza virus

◆ 4. Food Spoilage

- Caused by bacteria/fungi in stale food
- Preserved using: **salting, refrigeration, boiling, canning**

◆ 5. Vaccination

Process of injecting a **weakened or dead pathogen** to stimulate immune response and produce **antibodies**.

✓ Key Points:

- Provides **immunity** against specific diseases
- Discovered by **Edward Jenner** (Smallpox)
- Part of **preventive healthcare**

Common Vaccines:

Disease	Vaccine Type
Polio	Oral Polio Vaccine (OPV)
TB	BCG
Hepatitis B	Hepatitis B vaccine
Measles	MMR (Measles, Mumps, Rubella)

◆ 6. Immunity Types

Type	Description
Natural	From mother's milk or past infection
Artificial	Via vaccination

◆ 7. SSC CGL PYQ HIGHLIGHTS

- **Penicillin** → first antibiotic (by **Alexander Fleming**)
- **Yeast** → used in alcohol and bread making
- **Rhizobium** → nitrogen fixation in legumes
- **BCG** → vaccine for tuberculosis
- **HIV** causes AIDS; it's a **virus**
- **Plasmodium** causes malaria; spread by **female Anopheles mosquito**

DISEASES, VITAMINS & DEFICIENCY DISORDERS

◆ 1. Types of Diseases

Type	Definition	Examples
Communicable	Spread from person to person (by air, water, etc.)	TB, Flu, Cholera, COVID-19
Non-communicable	Do not spread between people	Cancer, Diabetes, Hypertension
Deficiency	Caused by lack of nutrients	Night blindness, Scurvy
Genetic	Inherited diseases	Hemophilia, Sickle-cell anemia

◆ 2. Vitamins – Types and Functions

Vitamin	Type	Function	Deficiency Disease
A	Fat-soluble	Vision, skin health	Night blindness
B1	Water-soluble	Nerve function	Beri-Beri
B2	Water-soluble	Energy production	Cracked lips, sore tongue
B3 (Niacin)	Water-soluble	Metabolism	Pellagra
B12	Water-soluble	RBC formation, nerves	Pernicious anemia
C	Water-soluble	Immunity, wound healing	Scurvy
D	Fat-soluble	Calcium absorption, bones	Rickets (children), Osteomalacia (adults)
E	Fat-soluble	Antioxidant, skin health	Infertility (rare)
K	Fat-soluble	Blood clotting	Delayed clotting

Fat-soluble: A, D, E, K

Water-soluble: B-complex, C

◆ 3. Important Mineral Deficiencies

Mineral	Function	Deficiency Disease
Iron	Hemoglobin production	Anemia
Iodine	Thyroid hormone (T3/T4)	Goitre
Calcium	Bone & teeth strength	Rickets, Osteoporosis
Phosphorus	Bone & cell formation	Weak bones
Sodium	Fluid balance	Muscle cramps, fatigue
Potassium	Nerve function, heartbeat	Weakness, irregular heartbeat
Fluorine	Teeth enamel	Tooth decay (deficiency) or fluorosis (excess)

◆ 4. Common Deficiency Disorders (One-Glance Table)

Deficiency	Disease	Symptoms
Vitamin A	Night blindness	Poor vision in dim light
Vitamin B1	Beri-Beri	Weak muscles, nerve issues
Vitamin C	Scurvy	Bleeding gums, delayed wound healing
Vitamin D	Rickets	Bow legs, weak bones in children
Iron	Anemia	Fatigue, pale skin
Iodine	Goitre	Swollen neck, thyroid malfunction
Calcium	Osteoporosis/Rickets	Fragile bones

◆ 5. SSC CGL PYQ HIGHLIGHTS

- **Scurvy** → Vitamin C deficiency
- **Rickets** → Vitamin D deficiency
- **Goitre** → Iodine deficiency
- **Night blindness** → Vitamin A deficiency
- **Beri-Beri** → Vitamin B1 deficiency
- **Anemia** → Iron deficiency

- **Pellagra** → Niacin (Vitamin B3) deficiency
- **Protein deficiency in children** → **Kwashiorkor**
- **Both protein & calorie deficiency** → **Marasmus**

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IMPORTANT DAYS & DATES

Important Days & Dates for SSC

Date	Day/Occasion
January 12	National Youth Day (Swami Vivekananda's Birth)
January 24	National Girl Child Day
January 26	Republic Day
February 2	World Wetlands Day
February 28	National Science Day (C.V. Raman)
March 8	International Women's Day
March 22	World Water Day
April 2	World Autism Awareness Day
April 7	World Health Day
April 22	Earth Day / International Mother Earth Day
May 1	International Labour Day
May 3	World Press Freedom Day
May 11	National Technology Day (Pokhran Nuclear Test)
June 5	World Environment Day
June 8	World Oceans Day
June 21	International Yoga Day
July 1	National Doctor's Day
July 11	World Population Day

Date	Day/Occasion
August 15	Independence Day
August 29	National Sports Day (Major Dhyan Chand's Birth)
September 5	Teacher's Day (Dr. Radhakrishnan's Birth Anniversary)
September 14	Hindi Diwas
September 27	World Tourism Day
October 2	Gandhi Jayanti / International Day of Non-Violence
October 8	Indian Air Force Day
October 16	World Food Day
October 24	United Nations Day
November 14	Children's Day (Jawaharlal Nehru's Birthday)
November 14	World Diabetes Day
November 26	Constitution Day
December 1	World AIDS Day
December 5	World Soil Day
December 10	Human Rights Day
December 25	Good Governance Day (Atal Bihari Vajpayee's Birthday)

INTERNATIONAL ORGANIZATIONS

Organization	Headquarters	Key Points
United Nations (UN)	New York, USA	Founded in 1945 ; 193 members; India is a founding member
World Health Organization (WHO)	Geneva, Switzerland	Coordinates international public health; formed in 1948
World Bank	Washington D.C., USA	Provides loans for development; established in 1944
International Monetary Fund (IMF)	Washington D.C., USA	Ensures global financial stability
World Trade Organization (WTO)	Geneva, Switzerland	Promotes free and fair trade; formed in 1995
UNESCO	Paris, France	Promotes education, culture, science
UNICEF	New York, USA	Child welfare & development
International Labour Organization (ILO)	Geneva, Switzerland	Promotes fair working conditions
World Meteorological Organization (WMO)	Geneva, Switzerland	Weather & climate data; linked with UN
ASEAN	Jakarta, Indonesia	10 Southeast Asian countries; India is a dialogue partner
SAARC	Kathmandu, Nepal	8 South Asian nations; founded in 1985
G-20	Rotating Presidency	India hosted G-20 in 2023
OECD	Paris, France	Economic cooperation; India is not a member
International Court of Justice (ICJ)	The Hague, Netherlands	Judicial wing of UN

NATIONAL ORGANIZATIONS OF INDIA

Organization	Headquarters	Function/Details
Election Commission of India (ECI)	New Delhi	Conducts elections in India
NITI Aayog	New Delhi	Policy think tank replacing Planning Commission (2015)
Comptroller and Auditor General (CAG)	New Delhi	Audits government expenditures
UPSC	New Delhi	Conducts Civil Services Exam
SSC	New Delhi	Conducts CGL, CHSL, MTS, etc.
ISRO	Bengaluru	Space research & satellite launches
DRDO	New Delhi	Defence R&D
RBI	Mumbai	Regulates banks & monetary policy
SEBI	Mumbai	Regulates share markets
IRDAI	Hyderabad	Insurance sector regulator
CBI	New Delhi	Investigates high-profile crimes
NABARD	Mumbai	Rural & agricultural finance
FSSAI	New Delhi	Food safety authority
National Human Rights Commission (NHRC)	New Delhi	Protects human rights in India

Important Commodity & Regulatory Boards in India

Board Name	Headquarters	Established Under / Year
Turmeric Board (NEW)	Erode, Tamil Nadu	Established in 2023 for promoting turmeric exports
Tea Board of India	Kolkata	Tea Act, 1953
Coffee Board of India	Bengaluru	Coffee Act, 1942

Board Name	Headquarters	Established Under / Year
Rubber Board	Kottayam, Kerala	Rubber Act, 1947
Spices Board of India	Kochi, Kerala	Spices Board Act, 1986
Tobacco Board	Guntur, Andhra Pradesh	Tobacco Board Act, 1975
Coir Board	Kochi, Kerala	Coir Industry Act, 1953
National Jute Board	Kolkata	Jute Board Act, 2008
Central Silk Board	Bengaluru	Central Silk Board Act, 1948
Coconut Development Board	Kochi, Kerala	CDB Act, 1979
Agricultural and Processed Food Products Export Development Authority (APEDA)	New Delhi	APEDA Act, 1985
Marine Products Export Development Authority (MPEDA)	Kochi, Kerala	MPEDA Act, 1972
National Horticulture Board (NHB)	Gurugram, Haryana	Society under MoA (1984)

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Key Takeaways for Exams:

- **Turmeric Board** is the newest (2023) → headquartered in **Erode, Tamil Nadu**
- **Coffee, Rubber, Silk, and Spices Boards** are often matched with headquarters
- **Tea Board** = **Kolkata**, one of the oldest commodity boards
- **APEDA & MPEDA** → export-focused authorities
- **Spices Board** regulates **52 spices**, including **pepper, cardamom, and turmeric (before Turmeric Board)**

FESTIVALS & CULTURE

Festival / Topic	SSC PYQ Highlights
Onam (Kerala)	Harvest festival; return of King Mahabali (SSC CGL PYQ)
Pongal (Tamil Nadu)	Thanksgiving to Sun God; harvest festival (SSC CGL PYQ)
Lohri (Punjab)	Associated with harvesting of sugarcane (SSC CHSL PYQ)

Festival / Topic	SSC PYQ Highlights
Bihu (Assam)	Harvest festival; 3 types: Rongali, Bhogali, Kongali (PYQ)
Chhath Puja (Bihar)	Worship of Sun God (SSC MTS PYQ)
Rath Yatra (Odisha)	Jagannath temple; chariot pulling festival (SSC GD PYQ)
Baisakhi (Punjab)	Sikh New Year; Khalsa Panth foundation (SSC CGL PYQ)
Diwali (Pan India)	Return of Rama to Ayodhya; Lakshmi Puja (SSC CHSL PYQ)
Holi (North India)	Victory of good over evil; color festival (SSC CGL PYQ)
Guru Nanak Jayanti	Founder of Sikhism's birth (SSC CGL PYQ)
Mahavir Jayanti	Birth of Lord Mahavir (SSC CHSL PYQ)
Buddha Purnima	Buddha's birth, enlightenment, death (SSC GD PYQ)
Navroz (Parsi)	Parsi New Year (SSC CHSL PYQ)
Kumbh Mela	Held at 4 places; UNESCO heritage tag (SSC CGL PYQ)
Karakattam (Tamil Nadu)	Folk dance form (SSC MTS PYQ)
Lavani (Maharashtra)	Folk dance with fast tempo (SSC CGL PYQ)
Kathak (UP/North India)	Classical dance form (SSC CGL PYQ)
Bharatanatyam (TN)	Classical dance; oldest dance form (SSC CHSL PYQ)

FAMOUS BOOKS & AUTHORS

Category 1: Famous Indian Authors

Book	Author
<i>The Discovery of India</i>	Jawaharlal Nehru
<i>Wings of Fire</i>	Dr. A.P.J. Abdul Kalam
<i>India After Gandhi</i>	Ramachandra Guha
<i>Train to Pakistan</i>	Khushwant Singh

Book	Author
<i>Midnight's Children</i>	Salman Rushdie
<i>God of Small Things</i>	Arundhati Roy
<i>The White Tiger</i>	Aravind Adiga
<i>Malgudi Days</i>	R.K. Narayan
<i>The Guide</i>	R.K. Narayan
<i>The Inheritance of Loss</i>	Kiran Desai

Book	Author
<i>An Era of Darkness</i>	Shashi Tharoor
<i>Interpreter of Maladies</i>	Jhumpa Lahiri
<i>A Suitable Boy</i>	Vikram Seth
<i>Fasting, Feasting</i>	Anita Desai
<i>Geetanjali</i> (Bengali & English)	Rabindranath Tagore
<i>The Argumentative Indian</i>	Amartya Sen
<i>The Great Indian Novel</i>	Shashi Tharoor
<i>Exam Warriors</i>	Narendra Modi
<i>The Namesake</i>	Jhumpa Lahiri
<i>Nectar in a Sieve</i>	Kamala Markandaya

Category 2: Famous World Authors

Book	Author
<i>War and Peace</i>	Leo Tolstoy
<i>The Brothers Karamazov</i>	Fyodor Dostoevsky
1984	George Orwell
<i>Animal Farm</i>	George Orwell
<i>The Old Man and the Sea</i>	Ernest Hemingway
<i>Pride and Prejudice</i>	Jane Austen
<i>Hamlet</i>	William Shakespeare
<i>Romeo and Juliet</i>	William Shakespeare

Book	Author
<i>The Alchemist</i>	Paulo Coelho
<i>A Brief History of Time</i>	Stephen Hawking
<i>Mein Kampf</i>	Adolf Hitler
<i>Long Walk to Freedom</i>	Nelson Mandela
<i>Crime and Punishment</i>	Fyodor Dostoevsky
<i>The Odyssey</i>	Homer
<i>A Tale of Two Cities</i>	Charles Dickens
<i>The Catcher in the Rye</i>	J.D. Salinger
<i>To Kill a Mockingbird</i>	Harper Lee
<i>The Diary of a Young Girl</i>	Anne Frank
<i>The Great Gatsby</i>	F. Scott Fitzgerald
<i>The Prophet</i>	Kahlil Gibran

Category 3: Books by/related to Freedom Fighters

Book / Work	Author / Freedom Fighter
<i>Hind Swaraj</i>	Mahatma Gandhi
<i>India Wins Freedom</i>	Maulana Abul Kalam Azad
<i>Why I am an Atheist</i>	Bhagat Singh
<i>Indian Struggle</i>	Subhas Chandra Bose
<i>Gita Rahasya</i>	Bal Gangadhar Tilak
<i>Satyarth Prakash</i>	Swami Dayanand Saraswati

Book / Work	Author / Freedom Fighter
<i>Unhappy India</i>	Lala Lajpat Rai
<i>Poverty and Un-British Rule in India</i>	Dadabhai Naoroji
<i>Pakistan or the Partition of India</i>	B.R. Ambedkar
<i>Common Sense</i> (referred in Indian texts)	Thomas Paine
<i>Bande Mataram</i> (Journal)	Aurobindo Ghosh
<i>Kesari</i> (Newspaper)	B.G. Tilak (editor)
<i>My Early Life</i>	M.N. Roy
<i>The Problem of the Rupee</i>	B.R. Ambedkar
<i>Toward Freedom</i>	Jawaharlal Nehru
<i>Letters from a Father to His Daughter</i>	Jawaharlal Nehru
<i>The Light of Asia</i>	Edwin Arnold (read by Gandhiji)
<i>The Spirit's Pilgrimage</i>	Mira Behn
<i>Who Were the Shudras?</i>	B.R. Ambedkar

Category 4: Autobiographies

Autobiography	Author / Personality
<i>The Story of My Experiments with Truth</i>	Mahatma Gandhi
<i>India Wins Freedom</i>	Maulana Abul Kalam Azad
<i>Wings of Fire</i>	A.P.J. Abdul Kalam
<i>Atmakatha</i> (in Hindi)	Lal Bahadur Shastri
<i>My Truth</i>	Indira Gandhi
<i>Straight from the Heart</i>	Kapil Dev
<i>Playing It My Way</i>	Sachin Tendulkar
<i>Long Walk to Freedom</i>	Nelson Mandela
<i>Toward Freedom</i>	Jawaharlal Nehru
<i>Autobiography of an Unknown Indian</i>	Nirad C. Chaudhuri
<i>The Tunnel of Time</i>	R.K. Laxman
<i>My Life in Full</i>	Indira Nooyi
<i>Truth, Love & a Little Malice</i>	Khushwant Singh
<i>A Shot at History</i>	Abhinav Bindra
<i>Open</i>	Andre Agassi
<i>The Race of My Life</i>	Milkha Singh
<i>On My Terms</i>	Sharad Pawar
<i>My Country My Life</i>	L.K. Advani
<i>My Presidential Years</i>	R. Venkataraman
<i>Courting Destiny</i>	Shyam Benegal

TOP 30 COUNTRIES – CAPITALS & CURRENCIES

Country	Capital	Currency
India	New Delhi	Indian Rupee
USA	Washington, D.C.	US Dollar
UK (Britain)	London	Pound Sterling
Russia	Moscow	Russian Ruble
China	Beijing	Yuan / Renminbi
Japan	Tokyo	Yen
France	Paris	Euro
Germany	Berlin	Euro
Canada	Ottawa	Canadian Dollar
Australia	Canberra	Australian Dollar
Brazil	Brasília	Brazilian Real
South Africa	Pretoria (exec), Cape Town (legis), Bloemfontein (judicial)	South African Rand
Nepal	Kathmandu	Nepalese Rupee
Sri Lanka	Sri Jayawardenepura Kotte	Sri Lankan Rupee

Country	Capital	Currency
Bangladesh	Dhaka	Taka
Pakistan	Islamabad	Pakistani Rupee
Afghanistan	Kabul	Afghani
UAE	Abu Dhabi	Dirham
Saudi Arabia	Riyadh	Saudi Riyal
Indonesia	Jakarta	Rupiah
Iran	Tehran	Iranian Rial
Iraq	Baghdad	Iraqi Dinar
Israel	Jerusalem	Israeli Shekel
Turkey	Ankara	Turkish Lira
Italy	Rome	Euro
Spain	Madrid	Euro
Mexico	Mexico City	Mexican Peso
Malaysia	Kuala Lumpur	Malaysian Ringgit
Singapore	Singapore	Singapore Dollar
Thailand	Bangkok	Thai Baht

FIRST RECIPIENTS OF IMPORTANT AWARDS IN INDIA & WORLD

Indian Awards – First Recipients

Award	First Recipient
Bharat Ratna	C. Rajagopalachari, Dr. S. Radhakrishnan & C.V. Raman (1954 – jointly)
Padma Vibhushan	Satyendra Nath Bose (1954) (<i>Science</i>)
Padma Bhushan	Durga Prasad Pandey (1954) (<i>Civil Service</i>)
Padma Shri	Nandalal Bose (1954) (<i>Arts</i>)
Dadasaheb Phalke Award	Devika Rani (1969)
Rajiv Gandhi Khel Ratna	Vishwanathan Anand (1991–92) (<i>Chess</i>)
Gallantry – Param Vir Chakra	Major Somnath Sharma (Posthumously, 1947–48 war)
Jnanpith Award	G. Sankara Kurup (Malayalam, 1965)
Sahitya Akademi Award	R.K. Narayan (English, 1955)
Arjuna Award	Krishna Das (Athletics, 1961)

International Awards – First Recipients (Indians)

Award	First Indian Recipient
Nobel Prize	Rabindranath Tagore (Literature, 1913)
Nobel Peace Prize	Mother Teresa (1979, born in Albania, Indian citizen)
Nobel in Economics	Amartya Sen (1998)
Nobel in Physics	C.V. Raman (1930)
Booker Prize	Arundhati Roy (1997) for <i>The God of Small Things</i>
Oscar (Academy Award)	Bhanu Athaiya (1983, Costume Design, <i>Gandhi</i>)
Oscar – Music	A.R. Rahman (2009, <i>Slumdog Millionaire</i>)
Ramon Magsaysay Award	Acharya Vinoba Bhave (1958)

BASIC FACTS ABOUT INVENTIONS

Invention	Inventor	Important Fact
Telephone	Alexander Graham Bell	Invented in 1876
Electric Bulb	Thomas Alva Edison	Patented in 1879
Radio	Guglielmo Marconi	Wireless communication pioneer
Television	John Logie Baird	Invented in 1927
Computer	Charles Babbage	Known as "Father of Computer"
Printing Press	Johannes Gutenberg	First movable type printing (15th century)
Aeroplane	Wright Brothers (Orville & Wilbur)	First flight in 1903
Steam Engine	James Watt	Improved earlier designs; key to Industrial Revolution
X-ray	Wilhelm Röntgen	Discovered in 1895
Penicillin	Alexander Fleming	Discovered in 1928; first antibiotic
Thermometer	Galileo Galilei (early version)	Mercury thermometer improved by Fahrenheit
Barometer	Evangelista Torricelli	Measures atmospheric pressure
Stethoscope	René Laennec	Invented in 1816
Battery	Alessandro Volta	Unit "Volt" named after him
Periodic Table	Dmitri Mendeleev	Arranged elements by atomic mass (1869)
Dynamite	Alfred Nobel	Nobel Prizes named after him
Atomic Theory	John Dalton	Modern atomic theory (1803)
Electricity (AC/DC)	Thomas Edison (DC), Tesla (AC)	AC power promoted by Nikola Tesla
Rocket	Robert H. Goddard	Father of modern rocketry
Law of Motion	Isaac Newton	Also discovered gravity

IMPORTANT DISEASES

Disease	Type	Caused By	Affects
Tuberculosis (TB)	Bacterial	<i>Mycobacterium tuberculosis</i>	Lungs (mostly)
Typhoid	Bacterial	<i>Salmonella typhi</i>	Intestine, Fever
Cholera	Bacterial	<i>Vibrio cholerae</i>	Intestine (Severe diarrhea)
Plague	Bacterial	<i>Yersinia pestis</i>	Lymph nodes, lungs
Pneumonia	Bacterial/Viral	<i>Streptococcus pneumoniae</i>	Lungs
Malaria	Protozoan	<i>Plasmodium</i> (via mosquitoes)	Liver & RBCs
Dengue	Viral	Dengue virus (Aedes mosquito)	Blood platelets
Chikungunya	Viral	Chikungunya virus (Aedes mosquito)	Joints, muscles
COVID-19	Viral	Coronavirus (SARS-CoV-2)	Lungs, respiratory tract
AIDS	Viral	HIV	Immune system
Hepatitis A/B/C	Viral	Hepatitis viruses	Liver
Polio	Viral	Poliovirus	Nervous system
Measles	Viral	Measles virus	Skin, respiratory tract
Mumps	Viral	Mumps virus	Salivary glands
Chickenpox	Viral	Varicella-zoster virus	Skin (rash)
Rabies	Viral	Rabies virus (animal bite)	Brain
Tetanus	Bacterial	<i>Clostridium tetani</i>	Nervous system (muscle spasm)
Ringworm	Fungal	Fungi	Skin
Scurvy	Nutritional	Vitamin C deficiency	Gums, skin
Rickets	Nutritional	Vitamin D deficiency	Bones

VITAMIN DEFICIENCIES

Vitamin	Deficiency Disease	Key Symptoms / Effects
Vitamin A	Night Blindness (Nyctalopia)	Poor vision in low light, dry eyes
Vitamin B1	Beri-Beri	Weak muscles, fatigue, heart issues
Vitamin B2	Ariboflavinosis	Cracks at mouth corners, sore throat
Vitamin B3	Pellagra	Diarrhea, dermatitis, dementia (3 D's)
Vitamin B6	Anemia, Irritability	Nervous disorders, skin issues
Vitamin B9 (Folic Acid)	Anemia (especially during pregnancy)	Neural tube defects in fetus
Vitamin B12	Pernicious Anemia	Fatigue, memory loss, nerve damage
Vitamin C	Scurvy	Bleeding gums, weak immunity
Vitamin D	Rickets (children) / Osteomalacia (adults)	Weak bones, bowed legs
Vitamin E	Infertility, Weak Muscles	Nerve and muscle damage
Vitamin K	Delayed Blood Clotting	Excessive bleeding, bruising

INDIAN SUPERLATIVES

Category	Superlative in India
Longest River	Ganga
Largest State (Area)	Rajasthan
Most Populous State	Uttar Pradesh
Smallest State (Area)	Goa
Longest River Bridge	Bhupen Hazarika Setu (Assam) – over Brahmaputra
Longest Rail Bridge	Vembanad Bridge (Kerala)

Category	Superlative in India
Longest National Highway	NH-44 (Srinagar to Kanyakumari)
Highest Dam	Tehri Dam (Uttarakhand)
Longest Dam	Hirakud Dam (Odisha)
Largest Lake (Freshwater)	Wular Lake (J&K)
Largest Lake (Saltwater)	Sambhar Lake (Rajasthan)
Largest Artificial Lake	Govind Ballabh Pant Sagar (Rihand Dam, UP)
Largest River Island	Majuli (Assam)
Largest Delta	Sundarbans Delta (Ganga-Brahmaputra)
Largest Desert	Thar Desert
Highest Peak	Kanchenjunga (India-controlled; in Sikkim)
Largest Cave Temple	Kailasa Temple, Ellora (Maharashtra)
Tallest Statue	Statue of Unity (182 m, Gujarat)
First Satellite	Aryabhata (1975)
First Nuclear Power Plant	Tarapur (Maharashtra)
First Women President	Pratibha Patil
First Women PM	Indira Gandhi
First IIT	IIT Kharagpur (1951)
First Man in Space (India)	Rakesh Sharma
First Woman in Space (India)	Kalpana Chawla (Indian-origin)

CENSUS 2011- FACTS & FIGURES

General Overview

- **First Census (complete):** 1881
- **Latest Census: 2011** (16th Census)
- **Conducted by:** Registrar General & Census Commissioner of India
- **Frequency:** Every **10 years**
- **Next Census:** Due in 2021
(Postponed)

Population Statistics (India)

Parameter	Data (2011)
Total Population	1.21 billion (121.08 crore)
→ Males	~62.3 crore
→ Females	~58.7 crore
Sex Ratio	943 females / 1000 males
Decadal Population Growth	17.64% (from 2001 to 2011)
Population Density	382 persons/sq.km
Urban Population	~31%

Parameter	Data (2011)
Rural Population	~69%

Literacy

Parameter Value

Total Literacy Rate **74.04%**

→ Male Literacy ~82%

→ Female Literacy ~65%

Most Literate State Kerala (94%)

Least Literate State Bihar (~63%)

Scheduled Castes & Tribes

Feature	SCs	STs
Total Population	20.13 crore	10.45 crore
% of Total Population	16.6%	8.6%
State with Highest Population	UP (SC)	MP (ST)
State with Highest %	Punjab (31.9%) (SC)	Mizoram (94.4%) (ST)
UT with Highest %	Delhi (SC)	Lakshadweep (94.8%) (ST)
Lowest SC % (State)	Nagaland (Negligible)	—
Lowest ST % (State)	—	Punjab, Haryana (~0.01%)

State & UT Superlatives

Category	State / UT
Most Populous State	Uttar Pradesh

Category	State / UT
Least Populous State	Sikkim
Most Populous UT	Delhi

Category	State / UT
Least Populous UT	Lakshadweep
Highest Literacy	Kerala
Lowest Literacy	Bihar
Highest Sex Ratio	Kerala (1084/1000)
Lowest Sex Ratio	Haryana (877/1000)
Highest Density	Bihar (1106 persons/sq.km)
Lowest Density	Arunachal Pradesh
Highest Decadal Growth Rate	Meghalaya

SSC PYQs You Must Know

- First census year (complete): **1881**
- Total population of India in 2011: **121 crore**
- Sex ratio of India: **943 females/1000 males**
- Highest literacy: **Kerala**, Lowest: **Bihar**
- SC % in population: **16.6%**, ST %: **8.6%**
- Most SCs: **Uttar Pradesh**, Most STs: **Madhya Pradesh**

CLASSICAL DANCES OF INDIA

Dance Form	State of Origin	Instruments	Famous Artists
Bharatanatyam	Tamil Nadu	Mridangam, Veena, Nattuvangam	Rukmini Devi Arundale, Yamini Krishnamurthy
Kathak	Uttar Pradesh	Tabla, Sarangi, Harmonium	Birju Maharaj, Sitara Devi
Kathakali	Kerala	Chenda, Maddalam, Elathalam	Kalamandalam Gopi, Kottakkal Sivaraman
Mohiniyattam	Kerala	Mridangam, Veena, Edakka	Bharati Shivaji, Kalamandalam Kshemavathi
Manipuri	Manipur	Pung (drum), Kartal	Guru Bipin Singh, Jhaveri Sisters
Odissi	Odisha	Mardala, Flute, Manjira	Kelucharan Mohapatra, Sanjukta Panigrahi
Kuchipudi	Andhra Pradesh	Mridangam, Violin, Flute	Vempati Chinna Satyam, Raja-Radha Reddy
Sattriya	Assam	Khol, Taal, Flute	Guru Jatin Goswami, Indira PP Bora

FOLK DANCES OF INDIA

Dance Form	State	Occasion/Theme	Key Instruments / Features
Bihu	Assam	Spring festival, harvest	Dhol, Pepa, Gogona
Garba	Gujarat	Navratri, worship of Devi	Dhol, Clapping
Dandiya Raas	Gujarat	Performed with sticks during Navratri	Dhol, Dholak
Ghoomar	Rajasthan	Performed by Rajput women	Traditional Rajasthani music
Kalbeliya	Rajasthan	Snake dance by Kalbeliya tribe	Poongi, Dufli
Bhangra	Punjab	Harvest festival	Dhol, Chimta, Tumbi

Dance Form	State	Occasion/Theme	Key Instruments / Features
Gidda	Punjab	Women's folk dance	Hand claps, rhythmic moves
Lavani	Maharashtra	Folk and romantic themes	Dholki, Lezim
Tamasha	Maharashtra	Social satire, storytelling	Harmonium, Tabla
Chhau	Jharkhand/Odisha/West Bengal	Martial, mask dance	Dhol, Shehnai, masks
Kummi	Tamil Nadu	Group clapping dance	No instrument, rhythmic clapping
Yakshagana	Karnataka	Mythological theatre	Chenda, Maddale
Dollu Kunita	Karnataka	Devotional dance	Large drum (Dollu)
Rouf	Jammu & Kashmir	Eid and spring festivals	Soft foot movements
Ali Ai Ligang	Assam (Mising tribe)	Agriculture-based festival	Drums, pipes
Thang-Ta	Manipur	Martial art dance	Sword and spear
Domkach	Bihar/Jharkhand	Marriage celebration	Clapping, folk songs